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THE BATTLE OF THE YELLOW SEA

THE OFFICIAL VERSION OF THE JAPANESE GENERAL STAFF

Translated by CAPTAIN W. T. HOADLEY, U. S. M. C.

FIRST ENGAGEMENT

The Japanese combined fleet had successfully made a threatening movement against the enemy's fleet, causing them to abandon their departure from Port Arthur. From that time the blockade was strict. The operations of the third army had greatly advanced. Commander-in-Chief Togo, in order to aid the army's operations and to keep up the blockade, issued orders in the latter part of July to the Saien division (*Saien, Heien, Chokai, Akagi,* two converted gunboats and two boats of the twelfth torpedo flotilla), and the fifth division under the *Itsukushima,* to divert and threaten the enemy in order to aid the third army. The first division and the rest of the main strength (the *Nisshin, Kasuga,* the *Yaeyama* added), the third and fifth (*Itsukushima,* etc.), the sixth division and the first, second, third, fourth and fifth destroyer flotillas, the first, second, sixth, tenth, fourteenth, sixteenth, twentieth and twenty-first torpedo flotillas, were ordered to watch in turn outside Port Arthur and maintain a strict blockade.

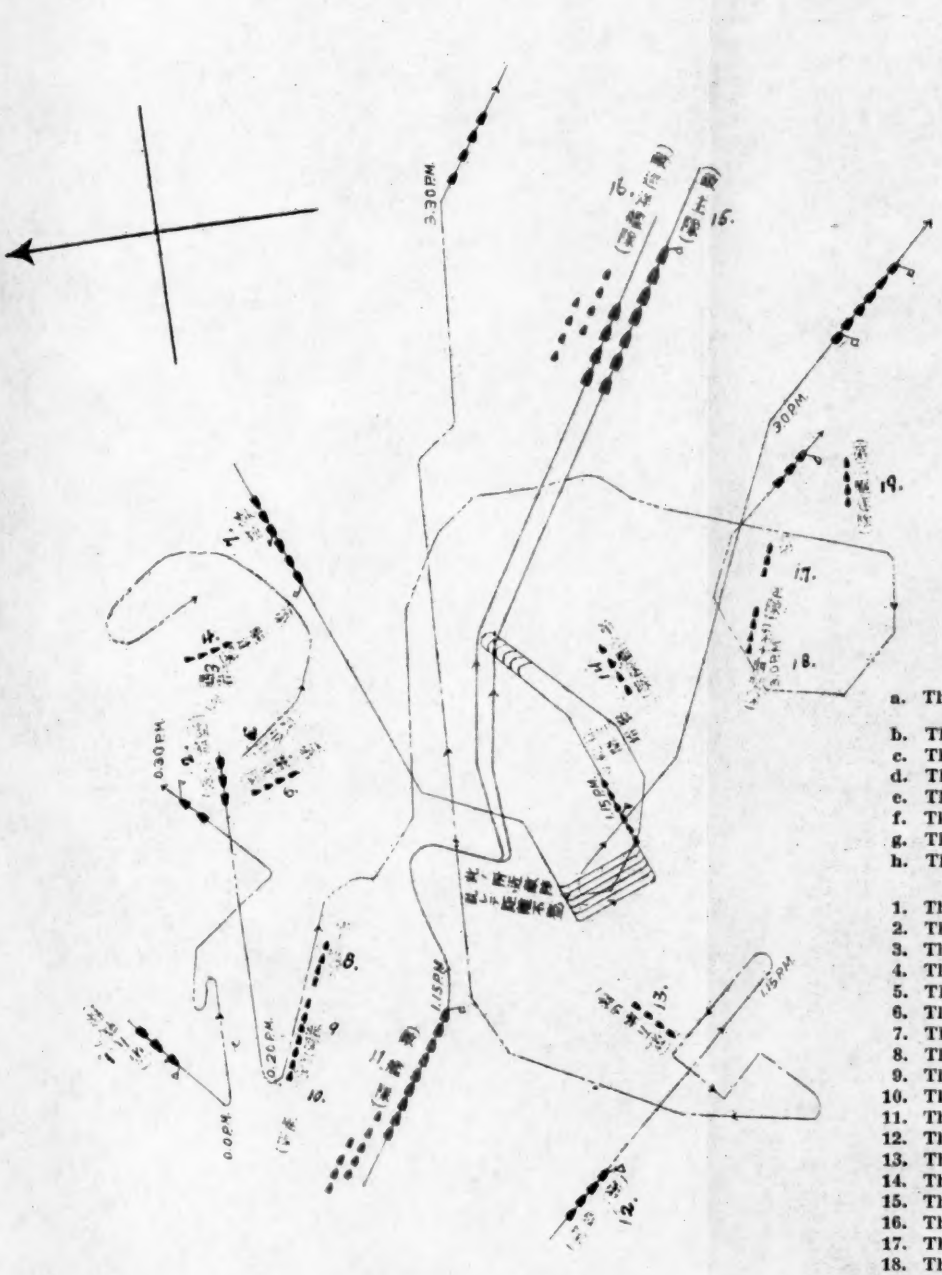
In the early morning of August 10 the commander-in-chief, Admiral Togo, was north of Round Island with the first division (*Mikasa, Asahi, Fuji* and *Shikishima*) and the *Yaeyama* (despatch

THE BATTLE OF LAKE CHAMPLAIN
From the painting by Davidson, owned by the Hon. Smith M. Weed, Plattsburgh. Half-tone furnished by Rodney Macdonough

boat), and from 6.35 a. m. received reports, continuously, regarding the departure of the enemy's ships. Cruising to the southward of Encounter Rock, he ordered the *Asama*, which was then in the Elliot group of islands, and the entire destroyer and torpedo flotillas, then in Dalny Bay, to get under way at once. A short while after this he received a message from the *Hashidate*, which was at Small Flat Island, informing him that the main fleet of the enemy had departed from the harbor and were on a course SE. A further report stated that the enemy's ships were headed for the Gulf of Pechili. The *Nisshin* and *Kasuga*, which were south of Cap Island, were ordered to join the fleet, and the *Yaeyama* was ordered to Dalny Bay, to convoy the torpedo craft. The *Nisshin* and *Kasuga* joining, single line ahead formation was taken by the first division, the ships' order being as follows: *Mikasa, Asahi, Fuji, Shikishima, Kasuga,* and *Nisshin*. At nine minutes past noon the first division arrived at a point about three sea miles SE. by E. of Encounter Rock. At 30 minutes past noon, changing course to WSW. they discovered the enemy's fleet cruising to the southward in the following order: *Tsesarevitch, Retvisan, Pobieda, Peresviet, Sevastopol, Poltava,* the cruisers *Askold, Pallada,* and *Diana,* in single line ahead, and the cruiser *Novik* and eight destroyers in the left wing, about 10 sea miles WNW. of Encounter Rock. At this point Admiral Togo, hoisting the battle flag on the *Mikasa,* ordered the engagement opened. The enemy's fleet at this time was in a single line ahead formation, composed of five battleships and four cruisers, while one cruiser and eight destroyers were in the left wing. The hospital ship *Mongolia* followed in rear. Although the weather this day was fine, a mist hung over the sea and a southerly breeze was blowing. Commander-in-Chief Togo feared that the enemy would return to Port Arthur and was desirous of tempting them to the open sea. At 1 p. m., changing course 8 points to port, the formation being line abreast, the course was SSE., but as the enemy seemed to head SE., course was again changed to port 8 points, making a single line ahead in inverse order, the *Nisshin* leading on a course ENE. At 1.15 p. m. each ship took up a long range fire. The first division now changed course to the northeastward, with the intention of pressing the advance ships of the enemy, but the enemy slightly sheering to port, then gradually to starboard, headed south, and seemed to be about to go astern of the Japanese fleet. Hereupon the first

PLATE I

A. 明治三十七年八月十日黄海海戦第一合戦図



凡例

a. The first engagement in the Battle of the Yellow Sea, Aug. 10th.
b. The Flagship of the Commander-in-Chief.
c. The Flagship of the Division Commander.
d. The First Division.
e. The Third Division.
f. The Fifth Division.
g. The Sixth Division.
h. The Enemy's Fleet.

1. The Fifth Division.
2. The Sixth Division.
3. The Encounter Rock.
4. The Second Destroyer Flotilla.
5. The Yaeyama.
6. The Second Destroyer Flotilla.
7. The First Division.
8. The Tenth Torpedo Flotilla.
9. The Second Torpedo Flotilla.
10. The Twenty-first Torpedo Flotilla.
11. The Enemy's Fleet.
12. The Third Division.
13. The Fifth Destroyer Flotilla.
14. The Third Destroyer Flotilla.
15. The Enemy's Main Fleet.
16. The Enemy's Cruiser Fleet.
17. The First Destroyer Flotilla.
18. The Fourteenth Torpedo Flotilla.
19. The Third Destroyer Flotilla.

division, at 1.30 p. m., changing course 16 points to starboard, reformed in single line ahead with the *Mikasa* leading. Steaming rapidly SW. on a right angle course with the enemy they concentrated fire on his leading ships. The enemy again changed course to port, and for a time his formation was chaotic. The Japanese, taking advantage of this, changed course gradually to north and opened fire. The enemy's units in rear quickly took position on the unexposed flank of their larger ships to avoid the fire. The enemy's line now naturally became an irregular double line ahead, and they were endeavoring greatly to escape to the southeastward. Admiral Togo, at this juncture, ordered the third division, which was to westward, to attack the enemy's cruisers. The first division attempted to cut off the advance of the enemy, but the movement being delayed, was unsuccessful, so they ran parallel, the enemy's line slightly in advance, the *Milkasa* being abreast of the center. The enemy now changing course to port, drew away and at 3.20 p. m. firing ceased for a time, but pursuit was made vigorously. In this phase of the battle the Japanese as well as the Russian ships were damaged. One 12-inch shell which hit aft on the sheltered deck of the *Mikasa* pierced the mainmast and killed 8 seamen. One division officer and four seamen were wounded. The *Asahi* had 1 seaman wounded. The *Nisshin* was struck by two shells and a paymaster and 2 seamen were killed; 1 lieutenant and 12 seamen were wounded.

The third division (*Yakumo, Kasagi, Takasago, Chitose,* the *Asama* absent) engaged in a search for the enemy, and at dawn of this day picked up a message sent by the *Fuso* to the *Mikasa,* which stated the fact of the enemy's departure. Later they received a report from the second destroyer flotilla to the effect that all the enemy's ships were to leave the harbor. At 10.23 a. m. the third division was cruising to the eastward, but receiving a report that the enemy showed intentions to proceed to the Gulf of Pechili, the third division changed course to the westward. At noon, when this division had arrived at a point SE. of Liau-ti-chan Promontory, the enemy was picked up, the enemy's ships steaming east. The third division alone proceeded towards the enemy. At 10 minutes past noon, in a single line ahead (the *Yakumo, Kasagi, Takasago,* and *Chitose*), cruising on a parallel course, increasing and decreasing the speed, were on the starboard hand of the enemy. They endeavored to draw the enemy

in the direction of the main fleet. At 20 minutes past noon they saw the sixth division bearing northeasterly. Then the first division came from the E. by N. and, continually changing course, seemed to try to force the enemy to the open sea by turning his leading units. The third division perceived that the fire was becoming more and more severe. On account of this the third division decided to attack the rear ship and cruised to the rear of the enemy. Increasing the speed and heading north they pressed upon the cruiser fleet which was the rear unit. At 3.15 p. m. orders were received from Admiral Togo to attack the cruiser fleet of the enemy. The pursuit became more intense. As the range decreased the firing became more severe. One shell, striking the main deck of the *Yakumo*, killed and wounded 27 people. The *Yakumo* concentrated her fire on the *Poltava*, but as the range was very great, orders were received to cease firing. Then Admiral Dewa ordered the *Yakumo* and the *Asama*, which had now joined, to follow the first division. The *Kasagi* and the other three ships were ordered to take position south of the enemy, in order to engage in the attack of the first division. By changing course to south they cruised obliquely towards the first division. Admiral Yamada, with the fifth division (the *Hashidate*, and *Matsushima*—the *Chin-yuen* and *Itsukushima* were absent), was in the vicinity of Small Flat Island watching for the enemy. Observing the enemy's fleet heading south, he wired the fact to the *Mikasa*, and at the same time he ordered the destroyer and torpedo flotillas to report to him at once. With the *Hashidate* and the *Matsushima* he proceeded to get into contact with the enemy. The enemy, after leaving the southeast Cape of Liau-ti-chan, appeared to enter the Gulf of Pechili. His division, coming out to the westward of Encounter Rock, changed course to the southwestward and watched the movements of the enemy. At this time in the east they discovered the first division. When that division opened fire about 1.08 p. m., in order not to interfere with the movements of the first division, the fifth division stood towards Gugen (Encounter Rock) in a single line ahead in the order of the *Hashidate*, *Matsushima*, and *Chin-yuen*, and endeavored to keep the enemy in sight. The *Izumi*, of the sixth division, arriving from the north, reported that she had been unable to discover her companion ships. Admiral Yamada then ordered the *Izumi* to cruise after the *Chin-yuen*. Wishing to close in on

the enemy he ordered the speed to be increased. About 4.40 p. m. he discovered the first division again bearing about SE. by S. Assuming that the sixth division ought to be near the first division, he ordered the *Izumi* to proceed in that direction. Division Commander Togo, of the third fleet, with the sixth division (*Akashi, Suma, Akitsushima*—the *Izumi* and *Chin-yuen* absent), was in the vicinity of Encounter Rock in the early morning. Knowing from the reports which were coming from all directions that the enemy's ships were coming out of the harbor, at 11.25 a. m. they proceeded to the westward of Encounter Rock, with the *Akashi, Suma,* and *Akitsushima*, but the enemy had already passed through the mine field and were steaming south in a single line ahead. Being pressed by the Japanese first division, the enemy's cruiser squadron were placed on the port side of the main fleet. Admiral Togo, division commander, being off the port bow of the enemy, stood southeast, but as the enemy changed course to SE. by E., and as the range seemed to shorten, he cruised on the same course at full speed. The range now becoming greater, he gradually changed course to the southward, crossing the enemy's bows and came out east of the first division. The enemy's fleet now changed course to southeast. When the course of the first division had become almost parallel to the enemy, the sixth division changed position to starboard. At 3.13 p. m., when situated about five sea miles in the rear of the sixth division, they quickly changed course in the same direction as the first division, but as the *Suma* had a mishap with her boilers, she was ordered to fall to the rear. The *Izumi,* which had previously been operating with the fifth division, now joined the line.

SECOND ENGAGEMENT

The combined Japanese fleet accomplished their wish to tempt the enemy to the open sea. At this point Commander-in-Chief Togo, seeing the range becoming greater, ordered the fire to cease temporarily, and increasing the speed, cruised parallel to the enemy for about two hours. At 5.30 p. m., about 40 sea miles north from the Cape of Shantung, the distance of the advance guard of the enemy was about 7000 meters. The *Poltava* opened fire and the Japanese fleet answered at once. The first division attacked the advance column of the enemy. After a severe engagement, lasting

about one hour, the enemy's fire seemed to weaken. At 6.37 p. m. a large shell from the Japanese fleet struck and exploded on the conning-tower of the *Tsesarevitch,* the leading ship, and the steering gear seemed to be damaged. She sheered to port and on account of this the enemy's formation was broken up. Some of the ships sheered to port and some to starboard. Taking advantage of this the first division at 7 p. m., making a detour to the north, surrounded the enemy and then changing course 4 points to port pressed the advance of the enemy by an echelon formation. The confusion among the enemy's ships was very great and they seemed on the verge of escaping to the westward. Fortunately just at this time the *Asama* and one part of the fifth division appeared northwest of the enemy and the third division to the southeast, and, all working together, drew a chain around the enemy's ships. The enemy, being in such a disorganized condition, were unable to fight. The *Askold, Novik,* and several destroyers attempted to escape to the southward, breaking through this chain. At this time the sixth division was some distance SE. by S. of the first division. Seeing this movement they hastily cut off the retreat. The third division, also changing course to port, pursued these ships. By sunset the remaining ships were unable to continue the fight. At 8 p. m. Commander-in-Chief Togo ordered the torpedo craft to make an attack. The larger ships ceased firing. In this engagement the *Mikasa,* the flagship of the first division, at 5.38 p. m. concentrated her fire upon the *Tsesarevitch,* which was the leading ship, and then shifted her fire to the next two ships. When the enemy's formation became disordered the *Mikasa* gradually drawing near, attacked the ships of the cruiser squadron with explosive shells, knowing that the range was effective. Later fire was shifted to two of the enemy's destroyers. The second ship, the *Asahi,* at the beginning of the engagement attacked the rear ship of the enemy and then concentrated upon the leading units and the fifth ship; after the formation became disordered concentrated on the *Retvisan* and other of the isolated ships. The third ship, the *Fuji,* at first fired on the leading ship and then shifted her fire to the four ships following. At about 7.02 p. m. the *Fuji* bombarded the *Retvisan,* which had taken the place of the *Tsesarevitch* as leading ship, and later concentrated on the *Pobieda* and the *Tsesarevitch.* The fourth ship, the *Shikishima,* opened fire at the same time as the *Fuji;* her fire was concentrated on the cruiser squadron. The fifth

ship, the *Kasagi,* opened fire on the rear ship, then changed to the fifth ship. Later, taking advantage of the enemy's disorder, she concentrated on the *Retvisan.* The sixth ship, the *Nisshin,* fired on the rear ship, and when the third ship of the enemy advanced toward her, shifted her fire and forced this ship to retreat. Thus in the second engagement the first division was mainly engaged, and caused great damage to the enemy, but in turn the ships of this division had been struck many times. The *Mikasa,* especially, was the enemy's chief target. The trace of shells on her vital parts numbered more than 20. One shell which exploded in the vicinity of a 12-inch gun at the beginning of the engagement destroyed it. Prince Hiroyasu was wounded. One seaman was killed and a first-class petty officer and 16 men were wounded. One shell which exploded on the forecastle at 6.30 p. m. killed 1 lieutenant, 1 signal petty officer and 5 seamen; wounded 1 captain, 2 lieutenant commanders, 1 lieutenant, 2 midshipmen and 10 seamen. Another shell killed 2 lieutenants, 1 midshipman and 15 seamen, and wounded the torpedo officer, 1 petty officer, 1 midshipman, 49 seamen and 3 servants. The second ship, the *Asahi,* received one shell under the water line on the port quarter and a fragment of another shell wounded a gunnery officer. The fifth ship, the *Kasagi,* was struck three times and 11 men were wounded. One shell which struck the *Nisshin,* the sixth ship, killed the chief engineer, 1 staff officer and 1 aide, 1 warrant officer, 1 chief yeomen and 6 seamen. Among these casualties nine of the bodies were blown to pieces. In addition two seamen were wounded. The *Shikishima* was hit by one shell, but no casualty occurred. The *Fuji* was unharmed. The first division intended to attack the cruiser fleet of the enemy in the first movement, but were unsuccessful. When the second movement was opened the flagship, the *Yakumo,* followed the *Nisshin,* the rear ship, of the first division, and the *Kasagi, Chitose* and *Takasago* were operating on a different course on the starboard quarter of that division. At 6 p. m. the *Yakumo* concentrated her fire on the *Poltava,* the rear ship of the enemy, and when the enemy became confused, fired on the ship nearest her. The *Kasagi* and the two other ships bombarded the enemy severely. The *Asama,* which had just arrived from the Elliot Islands was in time to cut off the retreat of the enemy's ships which were escaping. Admiral Dewa, seeing the *Askold* and *Novik* and several destroyers attacking the destroyer flotilla led by the *Yaeyama* and the *Suma,* which

was isolated to the southwestward, ordered the *Yakumo, Kasagi, Chitose* and *Takasago* to drive the enemy off. The *Yaeyama* and the torpedo craft by the aid of the above-named ships were safe. The *Suma* joined the sixth division. At this time, as the sun had set, firing was ceased and the ships steamed true east. Since the first movement the fifth division had been situated on the port quarter of the enemy's fleet. About 5.37 p. m., when the second movement was opened, this division changing course at will, at 7.10 p. m. drew near the enemy. A short time passing, the majority of the enemy's ships stood to the westward, but the *Asama* of the third division cut off their retreat with a severe fire. The *Hashidate,* the leading ship of the fifth division, at first opened fire with her starboard battery. The *Matsushima* and the *Chien* followed. At 7.46 p. m. the first division advanced on the leading ships of the enemy by detour, and in order not to interfere with the first division's movement, the fifth division changed course to port and opened fire. The distance becoming greater, firing ceased. The loss of the fifth division was very small. The *Chin-yuen,* was struck twice and 6 seamen were wounded. The *Yaeyama,* receiving orders to convoy the torpedo craft, at first went to Small Flat Island and later, changing her course to southwest, met the torpedo craft and delivered her orders received from Admiral Togo. The *Yaeyama,* then wishing to join the first division, suddenly came within range of the enemy's fire which she immediately returned. Deciding at this time that it would be impossible to join with the first division, she concentrated on the rear ship of the enemy by making a detour. At 8.40 p. m. the *Yaeyama* joined the first division. The sixth division had no opportunity to engage in the first movement, but cruised after the first division. The *Suma,* receiving damage to her boiler, was forced to reduce her speed and received orders from Admiral Togo, division commander, to fall in with the fifth division, which was about 10 sea miles north of the sixth division. Division Commander Togo leading with the *Akashi,* the *Izumi* and the *Akitsushima,* at full speed followed after the first division and at about 6.45 p. m. were to the southward of the enemy. At this time the second movement was already started. The *Tsesarevitch,* the flagship of the enemy, suddenly changing her course to port, broke up the formation of the enemy. The sixth division now joined with the other divisions in forming a cordon around the enemy's ships. The

Suma alone, in order to join the fifth division, cruised to the northeastward and at this time the majority of the enemy's ships passed between the *Suma* and the fifth division, which had also now changed their course to port. On account of the great distance, the *Suma* deemed it unadvisable to join with the fifth division and decided to again join the sixth division. The cruiser *Askold* leaving the enemy's line and the *Novik* also shaped their course between the *Suma* and fifth division the *Suma* engaging both of the enemy's ships. The sixth division, seeing the danger of the *Suma,* took position between that ship and the *Askold*. The *Askold* and the *Novik* at this time, with increased speed, escaped. As it was now sunset, Division Commander Togo ordered the firing ceased and, after ordering the *Suma* to the Elliot group of islands, he himself, leading the other three ships on a course SSE., continued to pursue the enemy.

THE ASSAULT OF THE DESTROYER AND TORPEDO FLOTILLAS

DESTROYER FLOTILLA

The attack of the larger ships in the second movement was very successful, but was abandoned at sunset. At this time the destroyer and torpedo flotillas, taking up the attack in the dark, searched for the main strength of the enemy which were now retreating to Port Arthur. On the morning of the 10th the first destroyer flotilla (*Asashio, Kasumi* and *Shirakumo*) was off the entrance of Port Arthur and the second destroyer flotilla (*Ikazuchi, Inazuma, Oboro* and the *Akebono*) was at the southern side of the entrance to the harbor and the third destroyer flotilla (*Usugumo, Shinonome,* and the *Sazanami*) was at the southwestern side of the entrance of Liau-ti-chan Promontory, and all were watching for the enemy. Perceiving the movement of the enemy departing from the harbor, each flotilla quickly reported to the division which was close at hand to them. The first destroyer flotilla took position on the bow of the enemy, the second flotilla on the port side, and the third flotilla in the rear. The fourth destroyer flotilla (*Hayadori, Harusame, Asagiri* and the *Murasame*) and the fifth destroyer flotilla (*Kagero, Yugiri Shiranubi* and *Murakumo*) were in Dalny Bay. When these two flotillas received the report of the enemy's leaving the harbor, they got under way and joined the third division. When the engagement opened, the

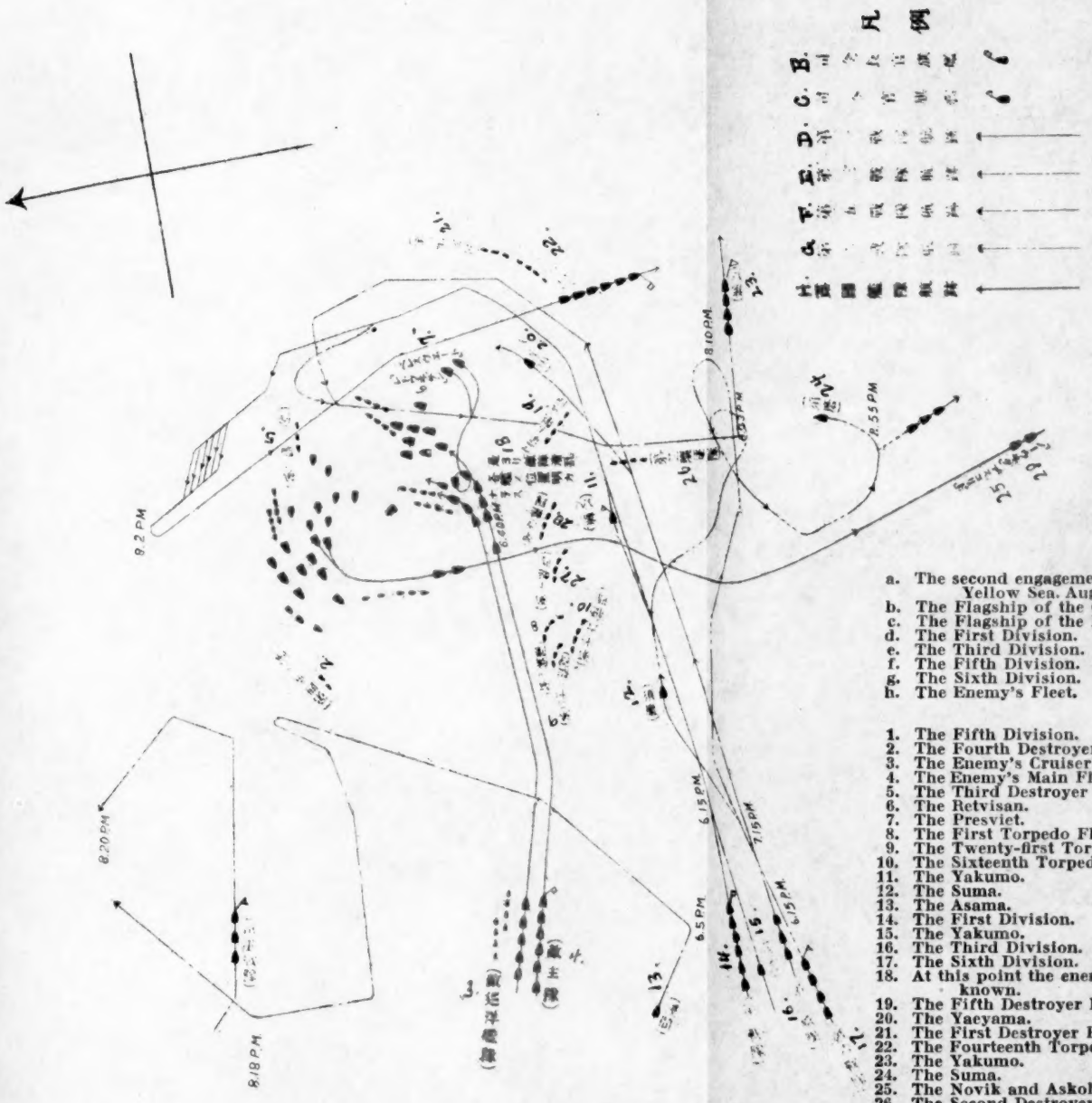
first and third destroyer flotillas and the fourteenth torpedo flotilla took position on the protected side of the first division, and the second destroyer flotilla increased their speed with the intention of joining the above-named ships. At 8 p. m., when the order was received for the attack on the enemy's fleet, the first destroyer flotilla, heading to the westward crossed the enemy's bow and on a parallel course on the starboard side of the enemy headed toward Port Arthur. Each boat conducted an attack on the ship abreast of it. At 9.40 p. m. the *Asashio* discharged a torpedo at a ship with three stacks. The *Kasumi,* observing three of the enemy's ships on an opposite course conducted an attack on the center ship, changed course in the opposite direction and finally lost sight of them. Anticipating that the retreat of the enemy would be to the northwest, she cruised in that direction. At dawn of the 11th she arrived off Cap Island. At this place she came across torpedo boat *No. 38* of the second torpedo flotilla whose movements were impeded and requested a tow, but as another boat with the second torpedo flotilla came along the *Kasumi* was relieved of the duty. Then meeting with the *Asashio* the *Kasumi* proceeded to Dalny Bay. The *Shirakumo,* coming across a ship of the *Pobieda* type, attacked her and later attacked another ship, then shaped her course northeast and by dawn of the 11th arrived at the entrance of the harbor. Although she saw the *Retvisan* and the *Mongolia* entering the harbor she did not open fire on them on account of dawn. The second destroyer flotilla which attempted previously to join with the first division and failing to accomplish this object on account of the wind and waves, searched in the vicinity of Port Arthur, thinking that the enemy would return to that place. Starting at 10.30 p. m., for a period of one hour she searched and was rewarded by discovering three of the enemy's ships in the dark. At once the *Ikazuchi,* on an opposite course with the enemy, discharged a torpedo at one ship at 11.42 and immediately ran to the northward. The *Inazuma* attacked the second ship and the *Oboro,* the third ship. After dawn of the 11th, the above three boats joining, reconnoitered off the entrance of Port Arthur and discovered a ship of the *Poltava* type and several other ships cruising slowly to the westward. The third destroyer flotilla about 10 p. m. came upon a ship with three stacks, and prepared to attack her, but as the Japanese torpedo flotilla suddenly appeared, in order to avoid a collision, the course was changed and the enemy was lost to view.

They then returned to Port Arthur. At 4 a. m. on the 11th, discovering gun flashes at a distance of several miles in the east, they proceeded in that direction and discovered the forms of three ships. This flotilla, thinking this to be an engagement between their own ships and the enemy, made signals but got no answer. Drawing closer, discovered them to be three ships of the enemy and one destroyer. The Japanese destroyers were about to make an attack when they received a sudden fire which caused them to change course. Hereupon each destroyer, after making an attack upon the enemy, proceeded to Dalny Bay. On the way they received a request for assistance from the *Asagiri* (the fourth destroyer flotilla), and escorting that ship they finally made Dalny Bay. The fourth destroyer flotilla, when they perceived the enemy was about to escape to the westward, proceeded in that direction. Receiving a severe fire from the enemy and in attempting to escape, the *Murasame* was obliged to leave the line on account of a block in her bilge pump. The other three ships, at about 8.20 p. m., when they were about to attack the enemy, were forced to give up the attempt on account of the severity of the enemy's gun fire. A second attempt was fruitless. At 8.50 p. m., when they prepared for the third attack, they discovered two ships of the enemy on the port bow and one on the starboard bow and received a severe fire from these. The *Hayadori* discharged a torpedo at the rear ship and again attacking the ship on the starboard hand, retreated to the southwestward. In this movement she lost the other destroyers. Steaming alone to Port Arthur at 3.30 a. m. on the 11th she discovered gun flashes to the southward, but not meeting with the enemy she later arrived at Flat Island. The *Harusame*, after attacking the leading ship of the enemy, cruising with the *Hayadori* and *Asagiri* lost each other on account of the fire of the enemy. At 2.20 a. m. on the 11th she met with torpedo boat *No. 63* (twentieth flotilla) and until dawn searched for the enemy, and then proceeded to Flat Island. One shell striking the *Asagiri* on the starboard casing of No. 3 boiler, destroyed the safety valve, and on account of the escaping steam for a time she was forced to retreat. At 9.48 p. m., after exchanging fire with the destroyers of the enemy for a short while, they discovered smoke southeast of Round Island, and closing in in that direction they were subjected to a heavy fire. One shell entering the after boiler room through the after starboard coal bunker, exploded. One petty officer and

8 men were killed. Although she had entirely lost power to move, she continued to fight; making temporary repairs she proceeded to the southward of Round Island at reduced speed and coming across the third destroyer flotilla with her assistance entered Dalny Bay about 5 p. m. The *Murasame,* whose bilge pumps were choked, after repairs pursued her companion ships, but on account of darkness was unable to overtake them. Then anticipating the movement of the enemy, at 10.05 p. m. on the starboard bow, hearing gun fire, she proceeded in that direction and discovered three ships of the enemy heading toward Port Arthur. This was at 30 minutes past midnight on the 11th. Quickly taking position ahead of the leading ship, she attempted to carry out an attack, but the enemy changed course, making it impossible to draw near. Furthermore, the blower of the forward boilers being destroyed, she gave up the chase and proceeded to the southward of Cap Island. Previous to her arrival at this place she was attacked by a destroyer of the enemy and returned the fire. The enemy's destroyer escaped toward Port Arthur. The *Murasame,* arriving northeast of Cap Island, engaged in reconnoitering duty. The fifth destroyer flotilla, awaiting an opportunity to attack, about 7.50 p. m. met the *Askold, Novik* and four or five destroyers advancing, and in order to escape these, lost sight of the main fleet of the enemy. Anticipating that the enemy's course would be about southwest, she searched in that direction. At 10.55 p. m. she discovered three ships and one destroyer. The Japanese destroyers engaged at will. The *Kagero* approached the rear ship and under a heavy fire delivered an attack and proceeded to the rendezvous and together with the *Yugiri* and *Shiranubi* received an attack from the enemy which caused the boats to separate. As dawn was approaching and being unfavorable for an attack proceeded to Cap Island. On the morning of the 11th they joined the other three ships and engaged in a blockade. The *Yugiri* made an attack and then joined the *Shiranubi.* At 4.13 a. m., to the southeastward of Encounter Rock, discovered three ships of the enemy and attacked one ship. The *Shiranubi* also attacked one and then both together attacked the third ship. Then they joined the *Kagero.* The *Murakumo,* discovering a ship and destroyer, discharged one torpedo. Exchanging fire with the destroyer she drew out of range; at 1 a. m. the 11th she met the *Yugiri* and *Shiranubi,* but later lost them. At 3.30 a. m. she discovered

PLATE II

A. 明治三十七年八月十日黄海海戦第二合戦圖



a. The second engagement in the Battle of the Yellow Sea. Aug. 10th.
b. The Flagship of the Commander-in-Chief.
c. The Flagship of the Division Commander.
d. The First Division.
e. The Third Division.
f. The Fifth Division.
g. The Sixth Division.
h. The Enemy's Fleet.

1. The Fifth Division.
2. The Fourth Destroyer Flotilla.
3. The Enemy's Cruiser Division.
4. The Enemy's Main Fleet.
5. The Third Destroyer Flotilla.
6. The Retvisan.
7. The Presviet.
8. The First Torpedo Flotilla.
9. The Twenty-first Torpedo Flotilla.
10. The Sixteenth Torpedo Flotilla.
11. The Yakumo.
12. The Suma.
13. The Asama.
14. The First Division.
15. The Yakumo.
16. The Third Division.
17. The Sixth Division.
18. At this point the enemy's position not clearly known.
19. The Fifth Destroyer Flotilla.
20. The Yaeyama.
21. The First Destroyer Flotilla.
22. The Fourteenth Torpedo Flotilla.
23. The Yakumo.
24. The Suma.
25. The Novik and Askold.
26. The Second Destroyer Flotilla.
27. The Tenth Torpedo Flotilla.
28. The Sixth Torpedo Flotilla.

another ship and a destroyer and alone attacked these, and in the early morning picked up the destroyer of the enemy, but soon lost her. Later she met with the *Kagero*.

THE TORPEDO BOAT FLOTILLA

On the morning of August 10 the first flotilla (*Nos. 69, 68, 70, 67*) were in the east of Winson Cape and the sixteenth flotilla (*Shirataka, Nos. 39, 71, 66*) were south of Port Arthur and were engaged in watching the enemy. The second flotilla (*Nos. 38, 37, 46, 45*) and the twenty-first flotilla (*Nos. 47, 49, 44*) were anchored at Ping-tu-tan. The sixth flotilla (*Nos. 56, 59, 57, 58*), the tenth flotilla (*Nos. 43, 42, 40, 41*), the fourteenth flotilla (*Chidore, Kasasagi, Hayabusa, Manazuru*) and the twentieth flotilla (*Nos. 62, 64, 63, 65*) were anchored at Dalny Bay. When the enemy left the harbor all flotillas accompanied the fleet, and awaiting sunset carried out an attack on the enemy's ships. The first flotilla, lacking coal and water, when the opportunity of attack drew near, thinking the enemy in retreat, pursued. At about 9.19 p. m. they met four ships which they thought to be the enemy's destroyers. At the time of eluding these, they became separated in two sections. *Nos. 69* and *68* searched in vain for the enemy. On account of the lack of coal and water they proceeded to the Elliot group of islands. Later *No. 70* also returned without meeting with success. *No. 67* alone at 9.40 p. m. discovered a ship of the *Poltava* type. Running southeast under fire she drew near and carried out an attack, then proceeded to the Elliot group of islands. *No. 46* of the second flotilla collided with *No. 37* in the daytime and having damaged her bow, returned to Dalny Bay. The other three ships after sunset proceeded southwest and separating at 10 p. m. searched for the enemy. After one hour *No. 38* attempted an attack on a ship with two masts and two stacks, pursued her and at 20 minutes past midnight on the 11th struck a mine which greatly damaged her port bow. One seaman was killed, the commanding officer and 8 men wounded, but the ship remained intact. Later sinking, she transferred her wounded men to *No. 39* (sixteenth flotilla) which happened to come across them at that time. After a short time had passed *No. 38*, again falling in with the enemy, received their fire, but escaped it, and meeting *No. 37* of the same flotilla, was towed by that ship into Dalny Bay.

No. 45, discovering a ship of two stacks, after attacking it returned to Ping-tu-tan. *No. 37* being blocked by the enemy's destroyers, could not carry out her object. After engaging the enemy for a short while, she picked up *No. 38*. The sixth flotilla about sunset pursued the enemy and as the boats became separated they operated singly. *No. 56* discovered a ship of the *Diana* type proceeding with a destroyer. After delivering two attacks at 9.20 p. m. she entered Ping-tu-tan. *No. 58* at 3.30 a. m. on the 11th discovered three ships of the enemy about 15 sea miles south of Port Arthur. She at once attacked the center ship. Next met a ship of the *Diana* type cruising south, accompanied by two destroyers. Attacking these, she proceeded to Ping-tu-tan. *Nos. 59* and *57* (*No. 57* separating from *No. 59*, operated singly), after meeting the enemy, returned to Ping-tu-tan. The tenth flotilla at sunset shaping their course NW. by W., pursued the enemy and at midnight of the 11th discovered a ship of the *Tsesarevitch* and *Retvisan* types and three destroyers in the vicinity of Encounter Rock. *No. 43* after attacking a ship of the *Retvisan* type retreated, and estimating the enemy's course made a further attack. *No. 42*, attacking a ship of the enemy, proceeded south. *No. 40* attacked a ship of the *Tsesarevitch* type and on changing course, her steering gear being jammed, control of the boat was lost. Dropping out of range she proceeded to Port Arthur. Later in vain she searched for the enemy. *No. 41* retreated. The boats one after another proceeded to the rendezvous. The fourteenth flotilla at the time delivered an attack. The *Manazuru*, which had remained behind at Dalny Bay to repair her boilers, arrived and joined. All together, searching for the enemy to the southward of Round Island, they discovered a ship of the *Diana* type. Thereupon the *Chidori* and the *Kasasagi*, after attacking the enemy, proceeded to the vicinity of Port Arthur. The *Hayabusa*, receiving no opportunity to attack, becoming separated at 11 p. m., attacked a ship of the *Tsesarevitch* type. The *Manazuru*, operating singly, at 8.50 p. m. attacked a ship of the *Diana* type and at 11 a. m. again attacked a ship of the *Tsesarevitch* type. After this all boats took up the blockade. The sixteenth flotilla, after sunset, estimating the whereabouts of the enemy, pursued them. The *Shirotaka* at 10.04 p. m. discovered a ship of the *Retvisan* type on the port bow and running to starboard discharged a torpedo. *No. 39* also attempted an attack. *No. 71*, on account of the dimness of

the enemy's form, gave up the attack. *No. 66,* losing sight of the enemy, finally stopped operations. After the attack the *Shirotaka,* losing her companion ship, singly attacked the enemy, but in vain, and at 3 a. m. on the 11th arrived at Round Island. *Nos. 39* and *71* met *No. 38* (second flotilla) drifting. Picking up the wounded they separated from her. *No. 38* about dawn proceeded to Round Island. *No. 66* at 2.05 a. m. discovered a ship with two stacks and two masts, conducted an attack and pursued, but after a short while returned to Round Island. The twentieth flotilla about 8.30 p. m., the boats separating, delivered an attack. *No. 62* discovered a ship of the *Diana* type and one destroyer. At 8.57 she attempted to cross the bow of the enemy. The enemy took up a serpentine course, but on account of her high rate of speed and the high seas, she was not able to accomplish her object. Cruising parallel with the enemy she discharged a torpedo and then, meeting *No. 64,* pursued the enemy at full speed. Later *No. 62* proceeded to Ping-tu-tan. *No. 64,* hearing of the enemy's condition from *No. 62,* proceeded to the northwestward. At 9.35 p. m. she discovered a ship of the *Tsesarevitch* type cruising slowly to the southward, attacked her and the next morning proceeded to Ping-tu-tan. *No. 63* at 9 p. m. discovered smoke on the port beam and drawing near discovered a ship of two masts and three stacks in company with one destroyer, but being unable to make out whether it was a large ship or not, she changed course and was lost to sight. *No. 63* searched in vain on various courses. At 1.30 a. m. on the 11th, meeting two destroyers of the enemy, she ran north to avoid the firing. Later meeting with the *Harusame* (destroyer flotilla), together they watched for the enemy, but on account of the dawn drawing near, returned to Ping-tu-tan. *No. 65* at 10 p. m. discovered a ship of the *Tsesarevitch* type on her starboard beam and with a severe fire attacked this, and changing course attacked a ship of the *Sevastopol* type at 3 a. m. on the 11th, then proceeded to Ping-tu-tan. The twenty-first flotilla, from 8 p. m., changing course very often, watched for the enemy. When they discovered the enemy on the port quarter, each boat carried out an attack. *No. 47* attacked a ship of three stacks and one mast, then made a retrograde movement. The next morning proceeded to Round Island. *No. 44* at midnight on the 11th, discovering the fire of the enemy to the northward, proceeded in that direction, and meeting a ship of the enemy cruising south, at once attacked her. At

1.10 a. m. encountered a ship of the *Pobieda* type. *No. 49* searched all night for the enemy without success.

THE RUSSIAN REPORT (TRANSLATED BY THE JAPANESE)

On July 29 (August 10) the Port Arthur fleet left the harbor at 9 a. m. The Japanese fleet was concentrated outside the harbor against us. On account of the enemy's floating mines the movement was very difficult. Being pursued by the enemy we fought several hours. The commander-in-chief was killed and the captain of the *Tsesarevitch* was rendered senseless. The *Tsesarevitch* that evening received a torpedo attack. About dawn we reached Shantung Promontory and upon examining the damage of the ships we decided we could not make Vladivostok, but proceeded to Kiaochao Bay. In this battle we had 4 officers of high rank killed and 9 wounded, including myself. Among the enlisted personnel innumerable were killed and wounded. At this Bay we found one cruiser and one destroyer of our fleet.

THE REPORT OF DIVISION COMMANDER

We passed the anchorage safely, but it took two hours. The commander-in-chief made signals saying, "Proceed to Vladivostok." At the time we were leaving the harbor the ships of the enemy surrounded us. Two gunboats and the second destroyer flotilla at once returned to the harbor. From noon our fleet advanced. The enemy's fleet confusedly cruised to the rear. Hereupon we escaped them by cruising to port. When we had passed into the range the engagement opened. In this engagement the *Askold's* forward stack was struck by a shell. Shortly after the second phase of the attack opened. At 5.45 p. m. the *Tsesarevitch* signaled, "The command has been changed." The enemy's ships surrounding us, the position was dangerous and we attempted to pass them through the weakest part of the line, so hoisting signals, "Follow my movements," advanced. My division followed. Several of the enemy's ships concentrated the fire upon us. At this time the *Askold* seemed to have caused damage to the enemy's cruiser. The *Asama* took fire. This seemed to be our means of escape. Four destroyers approached and attacked the *Askold,* but made no hits. My ship was greatly damaged. At last, breaking through the cordon, this division was able to escape. At this time

the Japanese ships left off the pursuit. We now advanced through the Liau-ti-chan Straits. The *Askold* was greatly damaged. Two stacks were entirely destroyed. Her speed being decreased, she proceeded to Vladivostok. My ship was headed for Shanghai. On July 31 we arrived at Woosung and entered dock.

Casualties:

One officer killed, four wounded.

Ten enlisted men killed, 44 wounded.

DIVISION COMMANDER'S REPORT

The *Presviet's* fighting top being destroyed, I had signal hoists made on the forward bridge which read, "Follow my movements," but the other ships seemed to misunderstand. On account of great damage and innumerable dead and wounded, we decided to return to Port Arthur. The *Retvisan, Pobieda, Poltava,* and *Sevastopol* followed me and the *Tsesarevitch* was in the rear of the line, but being separated, before dawn of the next day, the only ships that were able to arrive at Port Arthur were as follows: *Presviet, Pobieda, Retvisan, Sevastopol, Poltava, Pallada* and three destroyers.

Casualties:

Two officers killed, three wounded.

Casualties in the fleet:

Thirty-eight officers and men killed, 21 officers wounded, 286 seamen wounded.

The Japanese ships engaged:

Four first-class battleships.

One second-class battleship.

Four armored cruisers.

Five small type cruisers.

Sixty torpedo crafts.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

SOME FOREIGN AND OTHER VIEWS OF WAR AND THE STUDY AND CONDUCT OF WAR

By CAPTAIN ALBERT GLEAVES, U. S. Navy

A doctrine of war is made up of the principles of war which, having passed through the critical and constructive mind of man, or a number of men, have become a general body of instruction, by the light of which are solved the concrete problems of war.—Unsigned article in Edinburgh *Review*.

History teaches that war is inevitable. It is the teaching of the Bible, both of the old and new dispensations. From Genesis to Revelations, war is the all-inspiring theme of prophets, priests, and kings. Even He who was no disturber of the people said: "Where a strong man armed keepeth his palace, his goods are in peace; but when a stronger than he come upon him and overcome him, he taketh from him his armor wherein he trusted, and divideth the spoils." It is axiomatic that a nation that will not fight becomes a prey to those that will. "Without the fighting instinct," says one, "men become soft and effeminate." This was the condition of Prussia after Frederick the Great until Waterloo. It was Bismarck who declared that a nation could only be held together by blood and iron and not by declamations and resolutions.

A great peace advocate has recently said:

Peace means infinitely more than the absence of war. It means order and security and fair dealing and mutual good-will.

All noble and generous hearts long to put an end to war. But you cannot put an end to war unless you provide something better to take its place.

The abolition of war is not the first thing. The preparation of peace is the first thing. Conciliation and arbitration and firm agreements to uphold justice must precede disarmament.

What the world wants is a positive, creative, constructive peace—it wants peace with power.

In his latest volume, "Jena to Eylau," Field Marshal Von der Goltz says:

> A nation which desires happiness must also be powerful and skilled in arms. It must neither renounce its passionate love for the fatherland, nor lose its power to regard war as an earnest, bitter thing and a historical necessity. As long as the process of reconstructing states proceeds with the changing seasons, as long as human development does not stand still, so long will there be war. But those who do not wish to be ruined by it, must prepare in peace-time to endure the stern-armed contest with opponents and rivals.

As civilization spreads, and the triumphs of art and science improve, and broaden, and uplift the conditions of mankind, there is a tendency to believe that war recedes and will eventually vanish —perhaps in one hundred, or, it may be, in two hundred years. The most advanced of the prophets of the millenium admit that until the battle flags are furled, nations must be prepared for eventualities, as the phrase goes; others, however, who view war as the legacy of a barbarous age, point to the Hague as the court of last resort. But, "Woe betide the cabinet," quotes Von der Goltz, "which, half-hearted in its policy, and fettered in its ideas of war, meets an opponent whose crudely elemental principles acknowledge no law but that of inborn strength."

Every war in the past can be traced to commercial rivalry, or as a recent writer puts it: "Supported by history, it can be said in general that all wars between nations, all civil upheavals, all mighty social violences of whatever nature, have had at base, whether apparent or obscure, an economic grievance or a commercial ambition. . . . . At the base of every real revolution is a loaf of bread, and commerce is a latent war." Disagreements in economic questions concerning commerce and tariffs doubtless can be adjudicated, but the world knows that there are certain questions affecting the life of a state which cannot be submitted to arbitration; one writer says "nothing of vital importance ever will be." We know that the United States would never send to the Hague tribunal a controversy involving the Monroe Doctrine, or our control of the Panama Canal; that England would not tolerate any outside dictation regarding her policy in Egypt; and Austria would not permit interference with her position in Bosnia. And so, at the beginning of the twentieth century, when peace leagues and peace congresses and arbitration

treaties are as plentiful as the leaves in Vallambrosa, "war runs its course through a whole neighborhood of nations much as a contagious disease would run through a neighborhood of individuals"; the earth is stained with the blood of contending armies, and there are wars and rumors of war as in the days of the King of Israel, who blessed the Lord because he had taught his hands to war and his fingers to fight. "War," writes the ancient Heraclitus of Ephesus, "is the father of all things," and Lord Bason said: Wars are suits of appeal to the tribunal of God's justice when there are no superiors on earth to determine the cause. The only uncertainty concerning war is its hour of coming. The cloud of it constantly overhangs, like "a cloud of winter noons over the vanishing sun." Hence the gospel of preparation; and therefore the highest aim of statecraft is to maintain the nation in readiness and strength, as guarantees of peace. Says Treitschke, the German philosopher: "Among all political sins, the sin of feebleness is the most contemptible; it is the political sin against the Holy Ghost"; and Frederick the Great said that negotiations without arms are like music books without instruments.

Preparation for war is not restricted to building navies and organizing armies; it is based essentially upon the most effectual methods of using our armed forces in the presence of a hostile force and this preparation can only be acquired by long and serious study of the history of wars and the lives of great leaders. Von Moltke says: "A general staff cannot be improvised in the outbreak of war. . . . It must have been prepared long before, during peace, and must be in practical working, and in constant touch with the troops. But that is not enough. The general staff must know who its future commander will be. Must be in close touch with him and acquire his confidence, without which its position is untenable."

The study of war naturally suggests at once German authorities, not only because German officers have been the most prolific writers on the subject, but because, generally speaking, it is a fetichism to refer excellence in military training and preparation to German standards; this is well enough, but foreign writers have sounded a note of warning, and if the detailed accounts of the Kaiser maneuvers as reported in London newspapers are to be accepted, we will perhaps be inclined to moderate our enthu-

siasm for German administration and organization, and not burn all our candles at the Teutonic shrine. Describing the operations of the " Blue " army, on the plains of Silesia, the correspondent of the *Daily Mail* laconically says: It is difficult not to feel that Von der Goltz was taken undue advantage of in peace conditions; that the Blue commander's robust belief in the capacity of a thin line of troops to maintain a frontal action, and in the opportunity which this retaining power affords to move reserves for the decisive action on the wings." He points out that maneuver organization is not necessarily war organization, and although the troops had the latest equipments, ladder observation wagons for the artillery, traveling kitchens and aeroplanes, yet no means were taken to conceal the movement of troops, which in dry weather was betrayed by thick clouds of dust, as smoke betrays the presence of a ship at sea.

Besides, Berlin has not yet recovered from the shock of the Turkish defeats in the recent wars after a long training of the Turkish Army by officers of the German staff, but the latter have comfort in the reflection that the battles of Harbin and Mukden were won by an army moulded by German thought and in the German doctrine.

But there are other systems and other doctrines of war. The French have developed a school of thought radically different from the teachings of Moltke, and the French Army preens itself on the recent successes of the Greeks, whose army had been trained for months by French officers under General Eydoux.

English methods appear to be a composite application of the French and German doctrines.

This paper is not an attempt to enunciate a doctrine of war; that would be an unwarrantable presumption; it is desired only to emphasize the fact that there is such a thing, and that a doctrine of war is a necessity for every state that may be forced into an armed conflict with a first-class power. In the United States we have as yet no doctrine of war, and it is to be remembered that whether we borrow one or work one out for ourselves, its truth can only be established by the supreme test of modern war. Not until then can we learn " where theory and practice converge " and find an answer to the question asked by Von Hardeman a century ago, Was theory made for practice, or was practice made for theory?

In two brilliant but unsigned articles which appeared in the Edinburgh *Review* a year or so ago, the doctrine of war is discussed under the captions of "The British Army and Modern Conceptions of War," and "The Place of Doctrine of War." The writer points out that there are three fundamental principles of any doctrine of war; and although he is writing particularly of the army, it will be seen that these principles are equally applicable to the fleet:

1. The commander-in-chief must have a definite idea of what he wants to do.

2. That separate armies and even the corps when separate from the army must be amenable to his intentions.

3. He must possess over the minds of his subordinate commanders a mastery sufficient to insure his conception being carried out.

It is almost commonplace to observe that the first essential of success must be unity of thought between the commander-in-chief and his subordinate commanders. The latter must know how their chief would have them act under diverse circumstances as they arise, whether they are in his presence or not, because the fate of battles and campaigns depends largely upon the ability of subordinates to comprehend and execute the ideas and wishes of the commander-in-chief. To some men it is necessary to explain every detail; others of quicker wit easily grasp the situation on mere outlines. It is said that to Lannes and Davoust, Napoleon had only to indicate his plans, but upon many of the other marshals he could only rely when they were immediately under his eyes; "even Ney, 'the bravest of the brave,' lacked the capacity for broad views and correct application of strategical conditions"; and Napoleon's final overthrow is now attributed to the failure of his marshals. It was because there was no unity of thought, in this sense, that Chancellorsville was lost to the Federals, and it was because the veteran Steinmetz was incapable of following the workings of the mind of the crown prince that he was overwhelmed at Gravelotte. It was unity of thought and clear understanding that won for Nelson Trafalgar and the Nile, and for Farragut the battle of Mobile Bay.

Unfortunately, in this country the study of war attracts but little attention from the general public, and the profession of arms is not seriously considered. This is because we are not a military people. Not for an instant would we tolerate compulsory train-

ing. We deprecate a large army, and we are content with a navy that is inadequate to maintain the effectiveness of the two great policies for which we are most insistent. Our thoughts and ideals are mainly commercial, and the keys of the temple of Janus hang in the stock exchange. These are facts that inevitably invite collision with other nations, and as Lord Roberts said in a speech last year, referring to the relations between England and Germany, "No one can say when the crisis will come, but it will be within a period of time indicated by the convergence of the lines of destiny, which may at any moment be accelerated by some misunderstanding or by some conflict with the friend or ally of either country."

Both in the army and navy a period of intellectual activity has begun in the study of the art of war, and the War College is no longer regarded with indifference. Every military man who may be called upon to take part in the higher leading is beginning to ask the question: Of what use is armament, if there is not trained intelligence to make the *best* use of it? This does not refer to the mere technical skill of handling ships or to the exercises in the minor tactics of the fleet. What is suggested is the study of the great problems of strategy and grand tactics. As these are inseparable from national policy, it is apparent that a knowledge of world politics is indispensable, and thus a broad and attractive field is at once opened to the student who would learn of the very foundations of his profession. It is inadmissible to argue that in these progressive days a man can trust to so-called common-sense to help him in his crowded hour; or to supposed traits of congenital generalship, unless he has indeed the elemental military genius of Napoleon, or the generalship of Lee. The man who has only a superficial knowledge of chess, the oldest of all war games, would be a fool to imagine that he could defeat a Paul Morphy, but it is not less absurd, and it is more unreasonable, for an untrained commander-in-chief to expect success if his opponent is skilled in the art and science and history of war—other things being equal of course. Success, says Von der Goltz, is not to be obtained by an extempore effort. Experience, which alone demonstrates its possibility, is indispensable for its achievement.

To borrow another suggestion from the Edinburgh article, let us imagine two hostile fleets meeting. The "A" fleet is

thoroughly drilled and imbued with a doctrine of war. The "B" fleet has no doctrine. It follows then, that in the "A" fleet will be harmonious co-operation and unity of thought, while in the "B" fleet the second and third principles of command can never be realized. "It requires no demonstration to show the side that has the odds. In the problem of war the mind of the opponent is always the 'x' of the equation, and when there is no doctrine another unknown quantity is introduced, 'y' or 'z,' the mind of the other hostile leader who does not know what appreciation to give to the situation upon which he may have to depend."

It will be to his advantage if the commander-in-chief be at least fairly familiar with the methods of his opponent. Information of this kind may not always be obtained, nay, it may never be known; but the attempt to get it may be made by the attachés. Indeed, in these days, when there are but few secrets of materiél, it would seem that the most fertile field of usefulness for an attaché is the study and observation of the personal characteristics of the officers of the service in the country to which he is accredited, and his urgent endeavor should be to acquire knowledge of the personnel of that service. In the Civil War it was the intimate knowledge that the leaders had of their opponents that often decided the fate of the campaigns. For instance, during the Fredericksburg campaign, Longstreet's and Jackson's Corps were for several days 150 miles apart, and the united Federal Army was practically between them. But Lee and Jackson presumed largely on Burnside's want of enterprise. Major Steele says: "The best part of Lee's strategy appears to have been his understanding of the characters of his enemy's commanders and the use he made of it."

This illustration clearly indicates the importance of the personal equation in military operations, and the personal influence of character. Great leaders are men to whom subordinates are attached by a devotion which is ready to respond to any demand and to yield any sacrifice. Such personal devotion of men to leaders is notable in the histories of Napoleon and Lee. Paul Jones decided the fate of the battle of the *Bon Homme Richard* and the *Serapis* when he jumped to the quarter-deck and encouraged in his own person his officers and men to fight courageously. His orderly, describing the scene at this moment, writes:

"Every man whose wounds permitted him to stand up pressed forward to the post of danger, and the commodore had but to look at a man to make him brave. Such was the power of one heart who knew no fear! Such the influence of one soul that knew the meaning of no other word than conquest." This recalls the quotation applied to him by the Duchess of Chartres, "Wrathful Achilles of the Ocean." (L'Achille fougereux de l'Ocean.)

On this subject Henderson says:

> War is more of a struggle between two human intelligences than between two masses of armed men; and the great general does not give his first attention to numbers, to armament, to position. He looks beyond these, beyond his own troops, and across the enemy's lines, without stopping to estimate their strength or to examine the ground until he comes to the quarters occupied by the enemy's leader, and then he puts himself in that leader's place, and with that officer's eyes and mind he looks at the situation; he realizes his weakness, tactical, strategical, and political; he detects the points for the security of which he is most apprehensive; he considers what his action will be if he is attacked here or threatened there, and he then learns for himself, looking at things from his enemy's point of view, whether or no apparent risks are not absolutely safe.

To return to the study of history of war: Napoleon declared it was only by the study of the campaigns of the great captains, Caesar, Hannibal, Marlborough, that one can expect to become a great general. He himself was an earnest student of the art of war, and it was his intimate knowledge and familiarity with the campaigns of Marshal Maillebois that enabled him to successively defeat the Austrians and Italians under Beaulieu in 1796, when he first won fame. It is one of the most curious coincidences in history that shortly after he was appointed to the command of the Army of Italy Napoleon found himself practically in the situation of Maillebois fifty years before. The story is told by General Pierron in his brochure, "How the Genius of Napoleon was Formed." The striking feature however of the narrative is in the anti-climax of the campaign, when a situation presented itself not covered by the record of Maillebois' experience. It became imperative that not only the initiative must be taken, but that action must be prompt and original. He no longer had the experience of either Maillebois or Bourcet to guide him, and for the first time he was thrown upon his own resources. According to Pierron, he did not respond to the situation. Contemporaneous witnesses, says Pierron, are unanimous upon this point, and adds

"il a été tout d'abord décontenancé." His first thought was to retreat, and he ordered Augereau to abandon his lines and to fall back upon Rosabella and to destroy the bridges of Porto Lignano. When Bonaparte met Augereau at Rosabella, the latter protested against retreating and insisted upon attacking. Berthier, the chief of staff, remarked that the marshal did not know the position of the enemy, to which Augereau replied that he knew the position better than Berthier. Bonaparte then turned to Augereau and asked, "What do you think we should do to *save* the army?" Evidently it was no longer a question of only retreating but of escaping annihilation. It is an historical fact that Augereau's advice was accepted, but in his report of the operations, Napoleon does not mention Augereau's name, although it was to him he owed the conception of his fine movement on interior lines, by which he placed his forces between the two divisions of the Austrians and defeated them in detail, but as Von der Goltz points out, he who bears the responsibility is entitled to the glory, however much he may have made are of another's ideas. This is perhaps the only time that Napoleon ever doubted himself, at least so far as his land campaigns are concerned—he certainly was at sea in his conduct of the campaign of Trafalgar, for even his greatness as a soldier did not qualify him for sea strategy.

This story—si non vero, é ben trovato—emphasizes the importance of the antecedent study of war, and the value of "recollection" which Napoleon once declared was what others mistook in him for inspiration.

In the United States there have been writers on strategy and tactics, but no one has yet evolved a definite and concrete scheme for the conduct of war—not war plans in the ordinary sense of the word, or essays on administration or policy, but a doctrine that will teach that essential oneness in thought between the leader and his subordinates which insures harmony and co-operation in the presence of the enemy. There may be scores of war-plans in the portfolios of the general staff, and yet no doctrine. It was General Langlois who said, "better have doctrine without text, than text without doctrine."

Colonel Henderson, in his "Life of Stonewall Jackson," says:

> It was not until 1866 and 1870 that the preponderating influence of the trained mind was made manifest. . . . . The history of modern warfare

records no defeats so swift and so complete as those of Königgratz and Sedan. . . . . Both the Austrian and French armies were organized and trained under the old system. Courage, experience and professional pride they possessed in abundance. Man for man, in all virile qualities, neither officers nor men were inferior to their foe. But one thing their general lacked, and that was education for war. Strategy was almost a sealed book to them; organization a matter of secondary importance.

The Prussians were the first to recognize the fact that intellect and education play a more prominent part than stamina and courage, although history has proved it on countless battlefields. Sailors should not forget that Themistocles with 310 sail defeated the fleet of Xerxes of 600 ships; Tromp's victory over Oquendo, twice his strength; the battle of Camperdown, where, although the forces were numerically equal, the victory was gained by superior skill in the method of attack, and the Dutch Admiral declared that Duncan's strategy ruined him. The battles of the Nile, Trafalgar, Lake Erie, Lake Champlain, Stewart's capture of the Cyane and Levant, Navarino, and in our times, the battle of Lissa, and the naval battles of the Russo-Japanese War are all examples of the everlasting truth that the battle is not always to the strong.

After their crushing defeat by Napoleon at Jena and Auerstadt, the Prussians began a systematic study of the causes and conditions that led to their overthrow. They established a school for the study of war at Berlin, under the celebrated Scharnhorst, the son of a Hanoverian peasant, who was brought into the Prussian service by Lecoq. Not until after Sedan did the French recognize the value of an educated army, nor did the English until after the disasters of the Boer War. General Langlois attributes the English failure in South Africa to "lack of consistent and coherent tactical and strategical education, a doctrine of war infusing with life the whole body of an army, without which the most admirable texts and precepts enshrined in regulations are but dead bones and dry dust."

THE GERMAN DOCTRINE OF WAR

As the essays in the Edinburgh *Review* may not be accessible it is proposed to draw freely upon them in the following outlines of the German and French doctrines.

It is said that Frederick the Great gave orders which were like words of command; he moved his army as if it were a company

and his orders were transmitted by numerous aides. This was the extreme limit of one-man control over large bodies in the field. The lines were rigid, inflexible, and compact. Initiative was at low tide. The change in weapons forced a new system—semper mutabile should refer to weapons—of tactics, strategy, and control. At the beginning of the nineteenth century the range of the Austrian musket was 200 to 300 yards and each man carried 60 rounds; the 12-pounder guns ranged 1500 yards, and 500 with case shot. At Eylau "dense sheets of case-shot, fired at 80 paces distance, swept the approaching French masses." At Waterloo the French infantry used a flint-lock having a range of 180 yards. Each man carried 50 rounds, but in wet weather only 1 in 15 rounds was relied on. Trained infantry was suffered to fire two rounds per minute. The six-pounder was the standard field gun.

Armies moved from 7 to 8 miles per day, thus preventing concentration. Wars were wars of position. The short range of the guns made it necessary for the opposing armies to get as close to each other as possible. The counterpart of this in the navy was the yard-arm to yard-arm action.

Note here the difference in the maneuvers of army and navy in a general engagement, the same in principle to-day as yesterday. An army moving slowly and coming in contact with a regiment or a division will require perhaps five hours to envelop and destroy it. It will require a day perhaps to destroy similarly a corps, and should an army come in contact with another army, it may be several days before either is in a position to attack. Then the battle is fought standing, until a retreat is commenced. Now on the sea two hostile fleets on sighting each other, if not already in battle formation, take it up at once. The next move is to make the approach; and open the battle at 12,000 or 14,000 yards; then the fight is made at a speed of fifteen knots. Reserves cannot be utilized at sea as on shore for this very reason. Imagine that our fleet brings the enemy's fleet to action, and our admiral holds off a division of battleships at a distance of six miles. As the fight proceeds—a running fight—the admiral wishes to throw in his reinforcements, and he signals his reserves to join, even with increased speed, the reserve ships will be a long—a prohibitive—time in getting in position, in overtaking or coming up with the main body. On the other hand, on shore a flanking movement or turning movement is accomplished by a mobile force around

a stationary force. Thus it is clear that the sea action must be fought with all ships at the same time.

The German doctrine of war was expounded by Clausewitz, "who was the first to apply pure thought to the work of war." The greatest stress was laid upon the advantages of initiative, and it was based upon the principle that the destruction of the enemy's main army is the one true goal of warlike effort, and that it is to be brought about by the application of superior force at the decisive time. This comes very near being identical, in meaning at least, with the theory of war as expounded by General Bedford Forrest. Corbett's observation, that "the admiral who has no wider outlook than to regard the enemy's fleet as his primary objective will miss his true relation to the other forces which are working for a successful issue after the war," is not opposed to this dictum, although upon first reading it appears to be, because we are reminded that France did not accept peace until ten years after Trafalgar, nor did England obtain peace with Spain until fifteen years after the defeat of the Spanish Armada.

The German tactics of to-day are based on the immunity of "fronts" against purely frontal attacks and the increased weakness of the flanks, caused by long range weapons, which permit an assailant to bring to bear a strong converging fire. If the fire is converged on the flanks, then the latter will crumble toward the center and the whole be destroyed, because the conclusion is reached that the flanks are the objective, and the forward movement of the army should be so effected as to more readily attack and overlap the enemy's wings.

Hence the German method of applying the superior force at the decisive point at the decisive time is to concentrate in the battle-field separate bodies which have been more or less separated according to the topography. This is a method which will not probably appeal to most officers. In the first place it involves separation at the start, and the success depends upon each body arriving at the appointed place at the appointed time, which history proves to be a dangerous experiment with an active and alert foe; it places the commander-in-chief in the hands of his column commander, and the difficulty if not the impossibility of rectifying a mistake in directions.

Thus separated from the commander-in-chief and from each other, success can only be had by the spirit of co-operation and enterprise, and such initiative of the leaders of the separate columns that they will not hesitate to attack the enemy wherever found. This of course means bold and intelligent handling of the separate bodies by resourceful and able commanders. Good results can only be obtained from this method of war by an army whose peace training has arrived at the cultivation of a spirit of self-reliance, energy and bold initiative and has produced by this a very high average of leadership throughout the whole army. The German

general staff aims to produce not one Napoleon, but "to make of every corps and division commander a worthy peer of Constantin Von Alvensleben and of Hiller von Gartringen; men who will use the perfect instrument placed in their hands with the energy and intelligent initiative shown by the leaders of the Third Corps at Mars le-Tour, and of the First Division of the Guard at Königgratz.

Henderson says that the study of war had done far more for Prussia than educating its soldiers and producing a sound system of organization. It led to the establishment of a sound system of command. It was based on three facts: An army cannot effectively be controlled by direct orders from headquarters; the man on the spot is the best judge of the situation; intelligent co-operation is of infinitely more value than mechanical obedience. Von Moltke, the disciple of Scharnhorst, was the father of this school. His whole life of more than eighty years was devoted to the ambition of seeing his country wipe out the bitter recollection of the disasters of the double battle of Jena-Auerstadt, and of Friedland. He lived to realize that ambition.

Few events in history are more dramatic than Bismarck's dinner party at Berlin, when the King's despatch from Ems was received, informing him of the visit of Benedetti. Moltke and Von Roon were his guests. All the clap-trap of tragedy is at hand. The mis-en-scene is perfect. The hotel particulier, the stupid decorations, the three leaders of the Prussian Kingdom. Enter messenger and delivers to Bismarck the fateful telegram. Bismarck reads it, with a pencil annotates it, and then to his guests he reads first the original, and then the telegram as he has changed the sense of it. The revision acts like an electric current. "It is the call to arms," exclaims Moltke, and more wine is ordered, and the dinner which began in gloomy forebodings ends in hochs for the Vaterland. The next morning the populace in Paris are shouting "à Berlin."

A few hours after the dinner in Berlin there is a luncheon, also à trois, at the Tuilleries. Present, the Emperor, the Empress, and the Prime Minister. The conversation was all of war, which Ollivier tried in vain to resist. The Emperor, who was ill, took but little part in the discussion, but the Empress was insistent and declared that there must be war, and that it was her war (C'est ma guerrè), and the Minister returned immediately to the Chambers, to make his famous war speech, which in the months and

years to come was unjustly turned into a shaft of ridicule against him.

Another picture is drawn by Russell in his description of the battle of Sedan six weeks later. The old field marshal is standing with his king and with Bismarck near a pine wood overlooking the battlefield. "Moltke, when not looking through his glass, or at the map, stood in a curious musing attitude with his right hand to the side of his face, the elbow resting on the left hand crossed toward his hip." Russell was fascinated, he declares, as he watched "the three terrible fates before whose eyes the power of Imperial France was being broken to atoms." If ever since the days of Simeon, a man was ready to intone his nunc dimittis, surely it was Von Moltke in January, 1871, when the Kaiser Wilhelm signed the Treaty of Peace in the Palace at Versailles.

The French system of war, evolved from the studies of Langlois and others, is antithetical to the German system. It is based upon Napoleon's methods. They conceive that "battle comprises two distinct operations, the action of a detachment of all arms called the advance guard, including an unusually large proportion of cavalry, whose rôle is to discover the enemy's disposition, to fix him by fighting, without itself being destroyed, and by so holding him to give the commander-in-chief a target for the decisive attack by the mass of the army, held back under his immediate control until, his position formed on a sure basis of ascertained facts, the moment has come to overwhelm that portion of the hostile army whose destruction will most vitally affect the situation."

In a lecture on the spirit of the new French strategy, Colonel Maude (R. E.) points out the difference between the German and French systems, which is based, the one on linear formation, the other on the deep formation. The linear formation is the parallel advance of more or less equal columns with no large reserve and no strategical advanced guard. It moves on a broad front and is directed against the area in which the enemy is concentrating. Each officer and man is imbued with the spirit of initiative, of attacking always, attacking everywhere, and attacking everything. The formation is suitable when the force is in superior numbers and when it is not opposed by a general of the genius stamp of Napoleon.

With the deep formation, the army employing it must have mobility; the troops must hold some days without their supply trains; they must be able to bivouac and billet and requisition; they must be able to march far and march continuously, and they must have a very broad base with alternative lines of communication prepared beforehand, but above all they must have a commander who is able to make a plan quickly, and make a good plan. The essence of making a good plan depends upon the information that his cavalry get, and if his cavalry gets this information quickly.

Colonel Maude states that Napoleon's method of war changed at the outbreak of war with Austria and Russia in August, 1805, and that after twenty years of careful investigation the French general staff finally found the key to it in a single sentence, occurring in a letter written by Napoleon to Soult on October 5, 1806, in which he first declares his intention of marching in a "battalion square" of 200,000 men through the heart of the Prussian monarchy. By "battalion carré" he meant the grouping of army corps in such a manner that no matter from which direction the enemy approached him, the long marching columns would have time to deploy for action, and by their resistance gain further time for their comrades to come to their assistance; and the essential condition of success, when using the square formation, is the *absolute* necessity of first securing a fixed point about which to maneuver. Hence his maxim, "On ne maneuver pas qu'autour d'un point fixe." The French conclusions were that, while Clausewitz was correct in his idea of Napoleon's object, his later disciples had confused and misunderstood Napoleon's conception of war and his methods of making it, and that the German successes in 1866 and 1870 were due not so much to strategy and ideal training as to the fact that the German armies were better equipped, better prepared, and surpassed in activity, push and driving power which was so lamentably seen missing in their enemies. The German leaders were better, but their strategy, so the French staff contend, was doubtful and their battle tactics dangerous.

In the French system the leadership of the battle is thrown upon two men. The commander of the advanced guard must know just how long to hold the enemy until the commander-in-chief is ready to strike, and while driving the enemy upon him,

must time his retreat so as to avoid being overwhelmed. The commander-in-chief must know just when to strike the decisive blow, not too soon lest he strike the air, not too late lest he will be crushed and strangled.

General Upton tersely sums up Napoleon's "way" in these words: "Throughout his career it was the constant aim of Napoleon, both in strategy and tactics, to pierce the enemy's center, and then, falling upon his wings, destroy him in detail."

France has not neglected the lessons of 1870. A contemporary writer states that the French army is to-day efficient and prepared; that the officers are thorough, untiring, and conscientious; there is no arrogance or flaunting luxury; no élite regiments; nor is there any symptom of vain-glory, or any false sense of security.

Then there is the doctrine of no-doctrine, about which little need be said here.

The war between Russia and Japan and the Boer War are brilliant examples of the triumph of doctrine over the doctrine of no-doctrine. The Russians had no system of war; the Japanese, on the other hand, had been trained in German methods and were infused with the German conception of war. General Kuropatkin reiterates time and again the divergence of views held by his subordinate commanders as to the training and handling of troops. The want of a doctrine of war was undoubtedly contributory to defeat in both cases; "a sound, comprehensive, all-pervading doctrine of war is as important to an army as its organization; that it is the soul without which an army is but so much inert matter. This is equally applicable to the navy; we have only to substitute the word "fleet" for "army." In the report of the German general staff on the Boer War, the opinion is expressed that the British Army failed because "its military education was unsound, in that it was not infused with the essential principles of war deduced from history; that the leaders, superior and subordinate, had no mental grasp of the requirements of modern battle."

This is indeed a severe arraignment. It is the danger signal of the watchman on the tower: "Whosoever heareth the sound of the trumpet and taketh not warning; if the sword come, and take him away, his blood shall be on his own head."

Where, then, can we hope to work out our own doctrine of war? It is the aim and purpose of the War College to answer the question, by training along lines of reading and study on the subject of war; by the solution of problems on tactics and strategy; by cultivating a taste for the literature of national policies and international law. No student can take such a course of preparation seriously without being impressed with its vital necessity; he may go to scoff, but he will remain to pray. Napoleon said: "If I always appear to be prepared, it is because before entering on any undertaking I have meditated for long, and have foreseen what may occur."

The study of war should begin early in life when the mind is plastic and receptive, and when impressions are quickly received and long retained. For this reason the student officers at the War College should be selected from the younger officers of the service so far as possible, and those who have a talent or genius for that special study will be soon discovered and may be trained accordingly.

The need of this fundamental education was first recognized in the United States Navy more than thirty years ago by Rear Admiral Luce, and it was his insistence, perseverance and faith that finally led to the establishment of the War College, and then after its birth, under inauspicious circumstances, it was he whose nursing and fostering care, assisted by a few other enthusiastic officers, finally brought the foundling through its precarious infancy. It had difficulty in existing, and its sponsors received but little encouragement. For example: During its first year the founder of the War College happened to be on a board. A member of the board said to him: "What is that new-fangled thing you have got up there at Newport?" "What do you mean, the training station?" "Oh, no, that other thing." "You mean the War College?" "Yes, that's it; what is it for?" "Well, the object of the War College is to teach the art of war." "What! the art of war! Well, I'll be damned."

Another officer of high rank and distinguished service said: "You say you teach naval history and strategy and tactics; well, you have got Cooper and you have the Tactical Signal Book; what more do you want?"

The times of this ignorance God winked at, but now he calleth all men to repent.

This was the ordinary attitude at the time, and under the circumstances it was natural. The United States had never been in a war which involved over-sea operations, such as had confronted the English and French in their centuries of struggle; therefore, questions in strategy and logistics, which necessarily precede trans-oceanic campaigns, had never been presented to these men. They were graduates of a war which had not been hampered with the problems of a struggle with a foreign state; their work was in a more restricted area—in the rivers and bays, and bayous of their own shores. It was hard work and there was stiff fighting, whether of ironclads against non-descript craft, or forcing the passage of forts, or attacking sea-coast fortifications. It is therefore not surprising that those hardy fighters, to whom there were none superior, scoffed at the idea of learning war in a school. But yet the principles of strategy and tactics cried aloud in every one of their own operations, unheeded and unheard, but nevertheless as much present as they have been in every battle since Gideon, in the Valley of Armageddon, with his three hundred picked men, defeated the hosts of the Midianites in the battle of Moreh Hill in the year before Christ 1249. The lamps, the broken pitchers, and the battle-cry of Israel are fraught with lessons for us to-day.

This attitude of the higher officers towards the War College in its beginning extended to the department, but the apathy of the latter, although by no means so marked, had naturally a deterrent effect upon its development. This may be explained, however, by the fact that at that time and for some years afterwards the navy was passing through an era of transition which taxed the energies and resources of the department to the utmost; and so the War College, situated at a distance, did not receive the encouragement it would have had otherwise. When Montcalm sent de Bourgainville to Paris to represent the desperate situation in Canada, and to beg for reinforcements, the Ministry replied: "Quand la maison est en feu on ne peut pas faire attention a l'ecurie"; and so Canada was left to her own resources and eventually fell into the hands of the English. There were too many other irons to be heated in Washington, and the War College remained more or less neglected.

It will be doubtless argued that in the navy we have no unity of thought on war, Tot homines; quot sententiae. But on this

particular subject all will doubtless be content to follow the guides who have given years of thought and study to the problems of war. From this point of view the importance of the War College cannot be overrated. It is a serious study demanding strict application and especially a thorough digestion, for danger lurks in little knowledge. This suggests a story. During the Civil War an officer was dismissed from the navy for permitting a Confederate vessel to get through his blockading line. Commenting on this, a high authority states that the officer had a "smattering" of international law, and while he was trying to make up his mind if he had the right to stop a ship flying neutral colors, the latter passed him. The failure of the blockader was not entirely due to the fact that he knew only a little law, but that he did not know enough; it would have been better had he known none at all.

The question is: How are we to learn the art of war? Lord Seaton replies: "Fighting, and a damned deal of it." Napoleon said: "Only by the study of the campaigns of the world's great captains," and apropos of this opinion may be quoted McDougall's words: "It is not pretended that study will make a dull man brilliant, nor confer resolution and rapid decision on one who is timid and irresolute by nature, but the quick, the resolute, the daring, deciding and acting rapidly, as is their nature, will be all the more likely to decide and act correctly in preparation, as they have studied the art they are called upon to practice." And a distinguished Confederate general wrote of military leaders in general: "Conscientious study will not perhaps make them great, but it will make them respectable; and when the responsibility of command comes, they will not disgrace the flag, injure their cause, nor murder their men."

He is a bold man who denies the real need of conscientious study of this important subject as a preparation for the highest commands. Studies of history, war, world politics, and international law, strategy, tactics, and the war game comprise the post-graduate course the War College offers to the willing student. But the college teaches, by attrition, by inspiration, call it by any other name you will, something that is not found in books. It points out standards and ideals which are the essentials of military service. It teaches that the military hierarchy, not military feudalism, established by centuries of fighting on sea and

land, imposes obligations equally binding on officer and man; that without the distinctions of rank, discipline is impossible, and military science impotent.

In the recent conference at the War College expressions of opinion were requested on loyalty, initiative and decision of character, and the contributors to this symposius were practically of every rank in the navy and marine corps, as well as of the army. It is a healthy sign of the times, as well as refreshing and encouraging, to read the views that were presented for discussion; they strengthen faith in a service in a day when there are those who believe that our ideals are waning, and that they do not measure up to the standards of the old sea-captains—untitled knights of the blue ocean, to use General Porter's fine phrase.

Only this mental training can complete and round out the education of an officer; without it, the splendid virtues of coolness, resource, presence of mind, and even the power of bearing responsibility, must be dimmed. To attain it means hard work, but it is our reasonable service. It is well to remember that "men who have achieved are those who have done more than was expected of them; they have overcome discouragement and obstacles; they have made mistakes, but have retrieved them nobly; they have disregarded the warnings of the timid and the criticism of the envious, choosing rather to heed the inner voices. They have felt their strength even as the eagle knows the strength of his wings."

In the words of Lowell,

> God give us peace! Not such as lulls to sleep.
> But sword on thigh, and brow with purpose knit!
> And let our Ship of State to harbor sweep,
> Her ports all up, her battle-lanterns lit,
> And her leashed thunders, gathering for their leap!

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THE WILKES EXPLORING EXPEDITION

ITS PROGRESS THROUGH HALF A CENTURY: 1826-1876

By LOUIS N. FEIPEL

The important expedition known as the Wilkes, or South Sea, Exploring Expedition, fitted out in 1838 by national munificence, was the first that ever left our shores, and the first to be commanded by an officer of the United States Navy. But although organized on a most stupendous scale, and shrouded in a most interesting history, this expedition is to-day comparatively unknown.

INCEPTION AND MISCARRIAGE: 1826-1829

During the second session of the Nineteenth Congress a proposition for fitting out an expedition for the purpose of thoroughly surveying and charting those parts of the Pacific Ocean most frequented by our whaling and sealing vessels was for the first time prominently brought before Congress in the shape of numerous memorials, petitions and addresses. The House of Representatives appointed a select committee to consider the prayer of the memorialists, but owing to the great press of unfinished business and the exciting discussions which then absorbed the members, this matter was necessarily neglected.

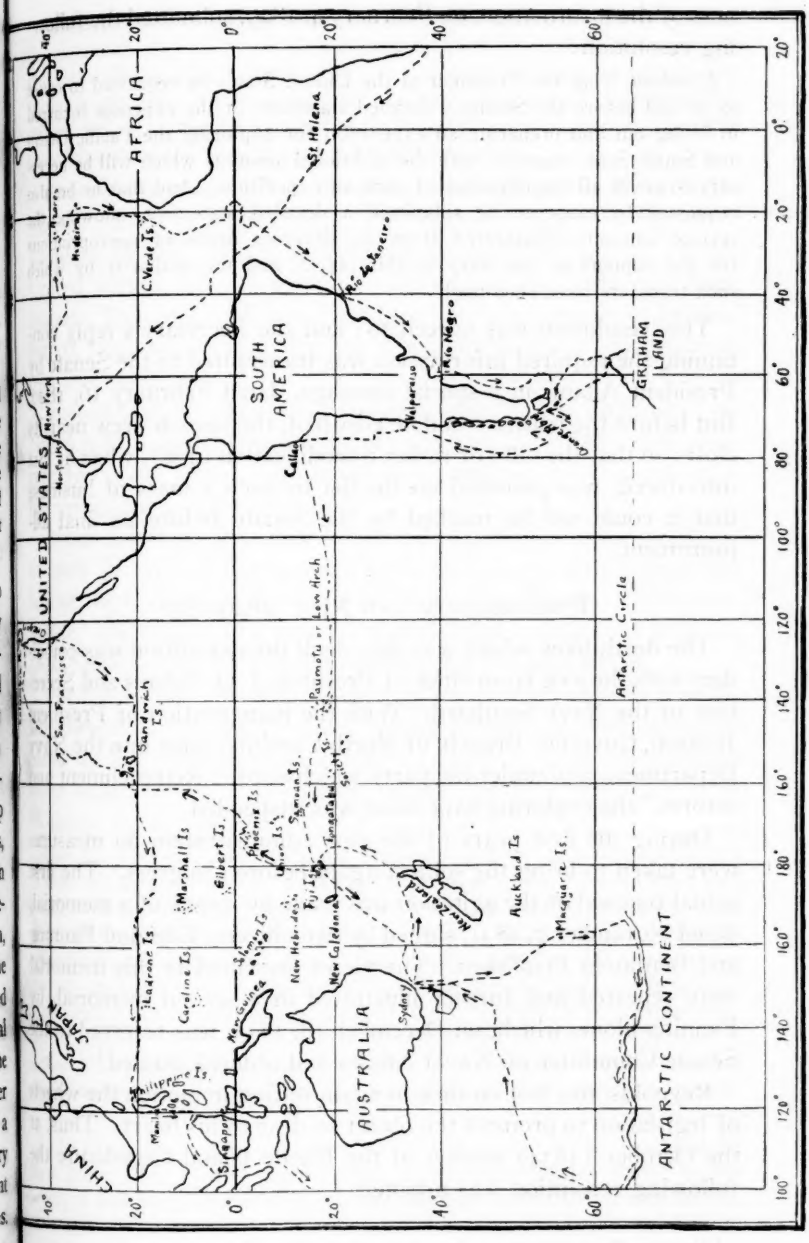
At the first session of the Twentieth Congress, namely, on January 22, 1828, a certain Mr. J. N. Reynolds addressed a letter to the Speaker of the House, in which he again broached the subject of an exploring expedition to the South Seas. Reynolds' letter was quickly followed by a memorial of the citizens of Nantucket and a petition from the citizens of New Bedford, Mass., both to the same effect. Reynolds, moreover, went himself to Washington, armed with sundry memorials signed by persons of respectability from New York, Pennsylvania, Maine, Virginia and Ohio, praying that Congress would either fit out such an expedition or at least

aid in the fitting out thereof. These memorials were referred to the Committee on Naval Affairs, which reported a bill authorizing the President to cause the expedition to be fitted out, and appropriating $50,000 for that purpose. Congress, however, omitted to pass the bill. Nevertheless, within a few days of the close of that session a member of the House (Mr. Reed, of Massachusetts) submitted the following resolutions, which, on May 21, 1828, were considered and agreed to by the House:

Resolved, That it is expedient that one of our small public vessels be sent to the Pacific Ocean and South Seas to examine the coasts, islands, harbors, shoals, and reefs in those seas, and to ascertain their true situation and description.

Resolved, That the President of the United States be requested to send one of our small public ships into those seas for that purpose; and that he be requested to afford such facilities as may be within the reach of the Navy Department to attain the object proposed: Provided it can be effected without prejudice to the general interest of the naval service; and provided it may be done without further appropriations during the present year.

These resolutions, as passed by the House, were never sent to the Senate for concurrence. Nevertheless, Secretary of the Navy Southard, supported as he was by President J. Q. Adams, proceeded to act upon the resolutions, not only as if they had passed both houses, but as if the original bill, which had not yet come up for consideration, had become a law. President Adams was anxious that the expedition should sail before the opening of Congress in 1828, and by the end of that year the sloop *Peacock,* under Master Commandant Thomas Ap Catesby Jones, was nearly ready to depart. However, the passage of the bill on the subject was plainly necessary to accomplish the purpose designed. Accordingly, soon after the opening of the second session, namely, on January 25, 1829, the original bill was taken up by the House and passed. Greater difficulty, however, was encountered in the Senate. The bill was referred to the Committee on Naval Affairs, which was directed to make inquiry of the Secretary of the Navy as to what the object of the expedition was, and whether or not the contemplated object could be attained in the course of a single voyage. To this inquiry the Secretary replied on January 29, 1829. In his reply he expressed the views of the Department relative to the expedition, and sought to justify his own actions. However, the committee, actuated, so they said, by the incomplete-



THE TRACK OF THE "VINCENNES"

ness of the information, on February 4, 1829, submitted the following resolution:

Resolved, That the President of the United States be requested to cause to be laid before the Senate a detailed statement of the expenses incurred in fitting out and preparing an expedition for exploring the Pacific Ocean and South Seas; together with the additional amounts which will be necessary to cover all the expenses of such an expedition. And that he be also requested to cause to be submitted a detailed statement, showing the several amounts transferred from the different heads of appropriations for the support of the navy to this object, and the authority by which such transfers have been made.

This resolution was agreed to; and the Secretary's reply containing the required information was transmitted to the Senate by President Adams in a special message, dated February 16, 1829. But before the matter could be adjusted, the session drew near its close; so that the bill (or rather a modification of it), when at last introduced, was preceded on the list by such a mass of business that it could not be reached by the Senate before its final adjournment.

REGENERATION AND RISE: 1829-1836

The death-blow which was thus dealt the expedition was coincident with the exit from office of President J. Q. Adams and Secretary of the Navy Southard. With the inauguration of President Jackson, Governor Branch, of North Carolina, came into the Navy Department, and under the party watchword, "Retrenchment and reform," the exploring expedition was suspended.

During the first years of the new administration no measures were taken to bring the subject again before Congress. The first actual renewal of the agitation was made by means of a memorial, dated November 7, 1831, signed by two citizens, Edmund Fanning and Benjamin Pendleton. The views presented in this memorial were repeated and further illustrated in a second memorial, by Fanning alone, which, on December 18, 1833, was referred to the Senate Committee on Naval Affairs and ordered printed.[1]

Reynolds, too, lost no time in again setting in motion the wheels of legislation to promote the object so dear to his heart. Thus, at the October (1834) session of the Rhode Island Legislature the following resolution was adopted:

[1] Twenty-third Congress, first sess., Sen. Doc. No. 10.

Resolved, That in the opinion of this general assembly, the subject of the memorial of J. N. Reynolds and others, dated November, 1834, praying that provision may be made by law for a voyage of discovery and survey to the South Seas, is highly important to our shipping and commercial interests, and is hereby recommended by the said assembly to the favorable consideration of the Congress of the United States.

Shortly afterwards, on November 22, 1834, the East India Marine Society of Salem, Mass., in a memorial signed by fifty-four members of the society, and addressed to the Congress of the United States, united its prayer with that of the State of Rhode Island. This memorial was introduced into the Senate on December 16, 1834, and was supplemented by sundry other manifestations of public opinion.

Instead of these documents being referred to the Committee on Naval Affairs, as had been the case previously (in 1828), they were referred to the House Committee on Commerce, which reported a bill providing for the expedition.

About this time, also, memorials and resolutions from the States of New Jersey and Connecticut brought the exploring expedition before the Committee on Naval Affairs of the Senate. This committee,[2] after examining into the policy of the measure, on May 21, 1836, likewise reported a bill providing for the expedition.

But the Senate, instead of acting upon this bill, offered it as an amendment to the regular naval appropriation bill, when that bill came up for consideration from the House. This amendment, after being several times modified, was finally adopted by both Houses. It read as follows:

That the President of the United States be, and he hereby is, authorized to send out a surveying and exploring expedition to the Pacific Ocean and South Seas, and for that purpose to employ a sloop-of-war, and to purchase or provide such other smaller vessels as may be necessary and proper to render the said expedition efficient and useful, and for this purpose the sum of one hundred and fifty thousand dollars be, and the same is hereby, appropriated out of any money in the treasury not otherwise appropriated, and in addition thereto, if necessary, the President of the United States is authorized to use other means in the control of the Navy Department, not exceeding one hundred and fifty thousand dollars, for the objects required.[3]

[2] The chairman of this committee was the Hon. Samuel L. Southard, of New Jersey, who, seven years before, as Secretary of the Navy, in the ardor of his zeal for the undertaking, had been called to account by the same committee over which he now presided.

[3] Stat. at Large, V, 29.

PREPARATION AND DELAY: 1836-1838

The exploring expedition was, however, to meet with many obstacles before it could again be carried into effect. Mahlon Dickerson, who was Secretary of the Navy at the time, was believed to entertain a very strong opposition to the measure; but President Jackson was favorably inclined toward the expedition, and ordered arrangements to be made to carry it into effect. Scientific men throughout the land at once turned their attention to this enterprise. By correspondence and otherwise they manifested extraordinary zeal for its success and urged that the best talent of the nation should be enlisted in its conduct.

Orders were soon issued for the completion of the frigate *Macedonian* for this service, and also for building the brigs *Pioneer* and *Consort* and the schooner *Pilot*, with the least practicable delay. The completion of the storeship *Relief* was likewise ordered. The recruiting for this service was put under the superintendence of Commodore Jones (who had again been selected for the command of the expedition), and Lieutenant Charles Wilkes was sent to Europe to procure such instruments and books for the expedition as could not conveniently be secured in the United States. Meanwhile, a number of excellent suggestions were offered by some of the foremost men of the country. Moreover, the co-operation of the American Philosophical Society of Philadelphia, the East India Marine Society of Salem, and the Lyceum of Natural History of New York was assured; and, more important still, Admiral Krusenstern, the renowned Russian navigator, drew up a set of memoranda, giving desiderata for completing the hydrography of the South Sea Islands.

President Jackson contemplated employing a scientific corps of eighteen persons. Accordingly, Secretary Dickerson opened a correspondence with some of our learned societies, and asked them to recommend suitable persons to form this corps.[4] As a result, certain gentlemen, who shared largely in the confidence of men of science, and who were burning to distinguish themselves in their respective departments, were recommended and selected.

[4] Among the institutions whose advice was thus sought was the old Naval Lyceum of Brooklyn. In an able report, a committee of the Lyceum made its recommendations, for which Secretary Dickerson expressed his great appreciation.

It was generally supposed that the expedition would be ready to sail within ninety days after its authorization by Congress. But when President Jackson returned to the capital in October, 1836, he was astonished to learn that very little progress had been made during his absence. The only excuse offered by Dickerson was that it was impossible to procure men for enlistment in this service. And as the season was then far advanced, all hope of seeing the expedition sail during that autumn passed away.

On February 6, 1837, in response to a resolution of the House of Representatives calling for information as to the progress which had been made in the arrangements for the expedition, Secretary Dickerson made a report to the President, which was transmitted to the House with an expression of a wish on the part of the Executive that all facilities might be given to the expedition that Congress could bestow and the honor of the nation demanded; and in the very same month Congress made appropriations under which five ships might be employed on this service. However, Congress did not require that so large a force should be employed unless, agreeably to the condition of the act authorizing the measure, such force should be necessary and proper to render the expedition efficient and useful.

From the reports of Secretary Dickerson it would appear that there was extreme difficulty in extending to our commerce at that time all the protection due it, and which the interest and the honor of the country demanded should be attended to in preference to the exploring expedition. Accordingly, Commodores Morris, Warrington, Patterson and Wadsworth were appointed commissioners to inquire whether the squadron could not be reduced, in number of vessels and men, with advantage to the country and without prejudice to the great objects of the expedition. The constitution of the squadron under Commodore Jones at this time was as follows:

Macedonian (frigate), Commander James Armstrong.
Relief (storeship), Lieut. Commanding Thos. A. Dornin.
Consort (brig), Lieut. Commanding James Glynn.
Pioneer (brig), Lieut. Commanding Wm. D. Newman.
Active (schooner), Lieut. Commanding Wm. G. Woolsey.

About this time, too, Lieutenant Wilkes, who had returned from his mission to Europe, and was then engaged in surveying George's Shoals, on the coast of Massachusetts, in the brig *Porpoise*, was

permitted to take what instruments he chose from those which had been procured expressly for the South Sea squadron and purchased with funds appropriated for that exclusive purpose. This meant that the exploring expedition would have to be detained until the *Porpoise* should return from that survey, or that the expedition should proceed to sea minus the abstracted apparatus. Moreover, towards the close of the year (1837), Secretary Dickerson convoked a new commission, composed of Commodores Hull, Biddle and Aulick, to cut down the force of the expedition. Without visiting the squadron, or informing themselves as to the real objects of the enterprise, these commissioners reported agreeably to the wishes of the Secretary. It was furthermore discovered that the liberal appropriations made by Congress were exhausted. There was therefore no alternative but to employ vessels already in the service, and to fit them out with the funds at the disposal of the Navy Department for that purpose. The sloops-of-war *Vincennes* and *Peacock* and the brig *Porpoise* were chosen, and two pilot boats (subsequently named the *Sea Gull* and *Flying Fish*) were added, which, with the storeship *Relief,* constituted the squadron as it was finally organized.

In the meantime, Commodore Jones, discouraged by the delay in the preparations for the expedition, and worn out in health, resigned the command on November 30, 1837. The command was then tendered to Commodore Shubrick, but the vessels not pleasing him, he declined. Then it was offered to Captain Kearny, but a change in the administration of the Navy Department (Secretary of War Joel R. Poinsett temporarily replacing Secretary Dickerson, who was ill) prevented the appointment of Kearny from becoming effective. Secretary Poinsett tendered the position of commander to Captain Gregory, but no sooner was it ascertained that Gregory was a friend of Reynolds and wished him to accompany the expedition than means were employed which forced Gregory to withdraw in order to maintain his self-respect. A tender was next made to Captain Joseph Smith. After some hesitation Smith repaired to Washington to make himself acquainted with the details of the service, and when these were explained to him he very frankly said that there was one portion of the duty expected from the commander which he could not perform. Neither would he accept the command unless Lieutenant Wilkes were assigned to this duty and appointed to one of the ships. Wilkes, however,

declined acting in the capacity in which it was proposed to employ him, and Captain Smith was allowed to withdraw from the command.

At this juncture, the idea of appointing Lieutenant Wilkes to the command seems to have suggested itself to Secretary Poinsett. Wilkes was confessedly a good seaman and navigator, and was one of the few officers who possessed the requisite attainments to qualify them for carrying out the views of the Government in dispatching this expedition and fulfilling the expectations of the scientific world. Wilkes accepted the command and selected Lieutenant William H. Hudson as his second. Hudson, however, refused to serve under a lieutenant lower on the list than himself. This difficulty was finally overcome by the expedition being divested of all military character and by the judicious advice of some of the older naval officers.

The preliminaries regarding the command being settled, the completion of the outfit went on with spirit. The scientific corps was at once reduced from thirty-two to eight persons, and some of their duties were assigned to the senior and junior naval officers. A mass of cumbersome material provided by the corps to preserve their collections, and which would have required an additional vessel for transport, was thrown aside. The six vessels which were finally placed under the command of Lieutenant Wilkes consisted of the sloops-of-war *Vincennes* and *Peacock*, the storeship *Relief*, the brig *Porpoise*, and the tenders *Sea Gull* and *Flying Fish*. The roster of the civilian corps, as it appeared on the date of sailing, and as it remained, for the most part, throughout the voyage, was as follows:

Charles Pickering, naturalist,
Joseph P. Couthouy, naturalist,
Titian R. Peale, naturalist,
William Rich, botanist,
Wm. D. Brackenridge, assistant botanist,
James D. Dana, mineralogist,
Horatio Hale, philologist,
Joseph Drayton, artist,
Alfred T. Agate, artist,
John G. Brown, mathematical instrument maker,
John W. W. Dyes, assistant taxidermist,
F. L. Davenport, interpreter.

After James K. Paulding took charge of the Navy Department in 1838, Secretary Poinsett, having first drawn up the general instructions under which the expedition was to proceed, resigned its further management into the hands of the new Secretary. And all things being in readiness, on August 9, 1838, the squadron dropped down to Hampton Roads, to await final sailing orders from the Department.

THE CRUISE: 1838-1842

The exploring squadron set sail from Hampton Roads on August 18, 1838. Wilkes' instructions required him, in the first place, to shape his course for Rio de Janeiro, crossing the line between longitude 18° and 22° west, and keeping within those meridians to about latitude 10° south, in order to determine the existence of certain *vigias,* or dangers to navigation, laid down on the charts as doubtful. After replenishing his supplies at Rio he was to make a particular examination of the Rio Negro, and then to proceed to a safe port, or ports, in Tierra del Fuego, where the larger vessels were to be securely moored, while he explored the Antarctic to the south of the South Orkney Islands, and between it and Sandwich Land, with the brig *Porpoise* and the tenders. In the meantime, the officers left at Tierra del Fuego were to make accurate examinations and surveys of the bays, ports, inlets and sounds in that region.

On rejoining the vessels at Tierra del Fuego, Wilkes was ordered to stretch towards the south and west with the whole squadron, as far as the *ne plus ultra* of Cook (or longitude 105° west), and to return northward to Valparaiso, where a storeship would join them in March, 1839. From that port he was to direct his course to the Samoan Islands, disposing his vessels in the latitudes where discoveries might reasonably be anticipated, and thence to the Fiji Islands, where he was to select a safe harbor for whalers and public vessels of the United States, and make such arrangements as would insure their being furnished with supplies.

From the Fiji Islands he was to proceed to Sydney, and then make a second attempt to penetrate within the Antarctic region south of Tasmania, and as far west as longitude 45° east, or to Enderby Land. The squadron was then to rendezvous at Kerguelen Land and proceed to the Hawaiian Islands, where a storeship from the United States would meet them in April, 1840. Thence

they were to sail to the northwest coast of America and make surveys of the coast of Oregon and California. From this coast they were to repair to that of Japan, taking as many doubtful islands as possible on their route, and make a particular examination of the Sea of Japan and the Sulu Sea. After completing these examinations, Lieutenant Wilkes was instructed to ascertain the disposition of the inhabitants of the islands of that archipelago for commerce, their productions, and resources; after which he was to proceed to the Strait of Sunda, pass through the Billiton Passage, touch at Singapore (where he would meet a storeship), and then return home by way of the Cape of Good Hope.

In addition to the orders necessarily suggested by the foregoing instructions, Wilkes directed every officer of the expedition to keep a journal, in which everything that occurred during the voyage was to be noted. These journals were to be submitted to him weekly for inspection, and on the return of the expedition to be disposed of according to the directions of the Secretary of the Navy. The scientific gentlemen were admonished to lose no opportunity of procuring information in their several departments. Meteorological observations were required to be taken four times a day; and particular instructions were given to measure and observe all astronomical and atmospherical phenomena, and every unusual appearance connected with the weather, such as shooting stars, zodiacal light, aurora australis, rainbows, halos, waterspouts, the Magellanic clouds, lightning, and rain.

After several days' trial, the storeship *Relief* was found to be so dull a sailer that Wilkes determined to part company. Lieutenant Long, who was in command of the *Relief*, was therefore ordered to proceed with all practicable dispatch to Porto Praia, and thence to Rio de Janeiro. In case of separation, the remaining vessels of the squadron were directed to rendezvous at Madeira. On September 16, 1838, the squadron reached its destination. Having disembarked with a portion of his officers and his corps of scientists, Wilkes explored the interior of the island and the more important harbors. On the 25th the squadron directed its course southward, with the intention of passing over those localities where shoals were supposed to exist and which had never been sounded. They also touched at the Cape Verde Islands.

On November 23 they came in sight of the magnificent harbor of Rio de Janeiro. Their chief object here was to replenish their

provisions and various other necessary stores; but this duty once completed, Wilkes employed the opportunity to examine the city and a portion of the interior. In consequence of the unseaworthy condition of the *Peacock*, and the long time required to fit her for continuing the cruise, the squadron was detained at Rio for several weeks. During this stay a seaman fell overboard from a lighter, and being accidentally struck by an oar, was drowned. Passed Midshipman William May jumped into the water to his relief, but did not succeed in saving him.

On January 6, 1839, the squadron, without the *Relief*, which had been dispatched in advance, left Rio de Janeiro and steered southward. A week was spent in making an examination of the bar of Rio Negro and inquiring into the facilities of the place for trade. This service was attended with great fatigue, owing to the rapidity of the tides and to a storm, which compelled the vessels, on the 30th, to put to sea. In the meantime, Lieutenant Long, in the *Relief*, was engaged in running a line of soundings along the coast of Patagonia and making examinations of the shoals said to exist in that quarter.

At Orange Harbor preparations were made for the first cruise into the Antarctic. According to instructions, Wilkes removed to the *Porpoise*, and on February 25, accompanied by the *Sea Gull*, under Lieutenant Johnson, sailed toward Palmer Land. On the same day Lieutenant Hudson, with the *Peacock* and *Flying Fish*—the latter in charge of Lieutenant Walker—sailed in the direction of Cook's *ne plus ultra*, under instructions to penetrate as far south of that point as the season and other circumstances would permit. Lieutenant Craven remained at Orange Harbor in command of the *Vincennes*, while the *Relief* was ordered to the Straits of Magellan for scientific duty, the corps of scientists having been temporarily transferred to that vessel.

The *Sea Gull* returned to Orange Harbor on March 22, having separated from her consort during the cruise, and the *Porpoise* arrived on the 30th. No new discoveries of importance had been made. The weather had proved unfavorable, and on penetrating as far south as the sixty-sixth degree of latitude, Wilkes had found himself surrounded on all sides by innumerable icebergs and field-ice, and was consequently obliged to retrace his course. While he was absent from Orange Harbor he visited the South Shetlands

and Palmer Land, but was only able to verify the discoveries of former navigators.

Lieutenant Hudson encountered the first icebergs on March 11, in latitude 63° 30′ S. and 80° W. longitude. The *Flying Fish* separated from the *Peacock* in a gale in the early part of the cruise, but fell in with her again before its termination. Hudson ascended a little above the sixty-eighth degree, and Lieutenant Walker went as high as the seventieth degree, when his further progress was impeded by impassable barriers of ice. Both vessels came very near being hemmed in by these frozen bulwarks. The *Flying Fish* was once rescued from a most perilous position by a fortunate breeze, and the *Peacock,* after being enveloped for six days in ice and icebergs, was with great difficulty worked out into the open sea, through a dense fog, by carrying all her canvas. The decks and rigging of the vessels were coated with ice and everything was dark, dreary and cheerless. To compensate for all this dreariness and gloom, however, several splendid exhibitions of the aurora australis were witnessed. The Magellanic clouds, the zodiacal light and the brilliant constellation of the Southern Cross were seen in all their perfection; and other luciform appearances, less striking perhaps, but full of interest and beauty, were likewise observed.

When Lieutenants Hudson and Walker found that the season was too far advanced for further progress, they gladly turned the bows of their vessels to the north. The *Flying Fish* reached Orange Harbor on April 11, while the *Peacock* shaped her course for Valparaiso. On April 17 orders were issued to the squadron at Orange Harbor to get under way, and about the middle of May the *Vincennes* and *Porpoise* joined the *Peacock* at Valparaiso. The *Sea Gull* and *Flying Fish* were left at Orange Harbor to await the return of the *Relief* from her cruise in the Straits of Magellan. That vessel, however, had been so long delayed that her commander thought best to sail direct to Valparaiso, where she arrived in safety. The two schooners left Orange Harbor on April 28, but were separated in a gale; and the *Sea Gull* probably foundered off Cape Horn, as no tidings were ever heard of the vessel or crew. Two young officers of great merit were lost with her—Passed

Midshipman James W. E. Reid, son of Governor Reid, of Georgia, and Passed Midshipman Frederick A. Bacon, of Connecticut.[5] The *Flying Fish* reached Valparaiso in safety on the 19th of May.

The next destination of the squadron was Callao, where the last vessel arrived on June 20, 1839. Here, as at Valparaiso, the magnetic and astronomical observatories were set up, and the scientific corps pursued their investigations with unceasing industry. After making the necessary repairs, furnishing their outfits and taking in stores, the squadron left Callao on the 15th of July for the projected western cruise. The number of vessels was now diminished by two, the storeship *Relief* having been sent home by way of the Hawaiian Islands and Port Jackson, and the little *Sea Gull* having dropped her wing under the fierce tempest.

A month, ending in the middle of September, was employed in a survey of the Low Archipelago. The attention of our surveyors had been drawn to this cluster by that distinguished navigator, Admiral Krusenstern, whose notes made a part of Wilkes' instructions. Clermont de Tonnerre was the first island visited. The natives resisted all attempts to land. Wilkes spoke to them through an interpreter, but the only answer he could get from them was: "Go to your own land; this belongs to us, and we do not want to have anything to do with you." Mr. Couthouy landed unarmed with presents, but was driven into the water by the inhabitants, who thrust at him with their spears. A useless landing was forced, however, by firing at them with mustard-seed shot, "which caused the chief and all the rest to retreat, rubbing their legs," as the Narrative expresses it. Two islands were discovered in this group that were not laid down on the charts. The locality of another, marked on the charts of Arrowsmith, had been previously passed over and the supposed land proved not to exist.

In the middle of September the squadron was united in Matavai Bay, in the Island of Tahiti, where Wilkes again set up the observatories. The time passed at Tahiti was engrossed by the multiplied and arduous duties of the service on which the squadron was sent. Boats and vessels were dispatched on surveys, the officers and naturalists explored the interior of the islands and collected

[5] Lieutenant Wilkes bore honorable testimony to the high characters of these two officers and to their ardent zeal in the service of the expedition. A cenotaph at Mount Auburn commemorates the sad event which deprived the navy of two of its most promising young officers.

facts and specimens, and the labors of the magnetic and astronomical observatories, of the tidal and meteorological registries, were never omitted.

The Samoan Islands were the next scene of the combined labors of the squadron. On the passage thither, Bellingshausen's Island and Rose Island, both uninhabited, were visited. Immediately after the arrival of the squadron in the Samoan group the different islands were divided among the vessels for survey and examination. An observatory was established at Tutuila and the headquarters of the commander temporarily fixed on that island. The *Peacock* and *Flying Fish* joined the *Vincennes* at Pago Pago on the 18th of October and were at once ordered to proceed to Upolu.

While the squadron remained at these islands a *fono*, or council, was held by the chiefs of Upolu, Manono, and Savaii, at the request of Wilkes, in which rules and regulations were agreed upon and adopted for the security and protection of American whalers. A son of the Rev. Mr. Williams was likewise appointed consul of the United States and recognized as such by the council. A native was also tried by a council of chiefs for murdering an American citizen twelve months before and was found guilty. He was in the first instance sentenced to be executed, and preparations were made to carry the sentence into effect, but at the suggestion of Wilkes and Lieutenant Hudson, his punishment was commuted to banishment for life, and he was afterwards conveyed to Wallis Island on board one of the vessels of the squadron, in their subsequent passage to Sydney. At Upolu, too, Lieutenant Hudson made an unsuccessful attempt to capture a noted chief, Opotuno, who had taken possession of two boats belonging to the whale-ship *William Penn*, of Nantucket, killing the first mate and two boat-steerers. The second mate was left on the beach as dead, but was removed to a hut by some native women, through whose benevolent care he recovered.[6]

All the islands having been surveyed (except the south side of Upolu, which was finished by the *Porpoise* during a later visit to the group), the squadron assembled at Apia and departed for Sydney, where the vessels reassembled in the latter part of November, 1839. In this port the officers experienced the utmost kindness

[6] In February, 1841, Lieutenant Hudson made a second attempt, but with no better success.

and hospitality from the governor, Sir George Gipps, from all the officials, civil as well as military, and from the citizens generally. Preparations were accordingly made for the second Antarctic cruise, while the scientific corps explored the country in the neighborhood of Sydney, adding to the vocabularies of the philologist and the stores of the naturalist.

When orders were finally issued to get ready for sea, much remained undone that might have promoted the health and comfort of the crews and rendered the expedition more productive of results. The officers in command were well aware of the deficiencies in their preparations. Yet the season was now far advanced. From one cause or another they had been behind time ever since they had left home, and further delay at this juncture was entirely out of the question. Wisely, therefore, and from the most commendable motives, they determined that no trifling difficulties or embarrassments should balk them in the execution of the enterprise which they had so much at heart. All the preparations that were possible having been made, sails were set and anchors hove up, and on December 26 the entire squadron stood out to sea; while the scientific corps were ordered, after completing their researches in New South Wales, to proceed to the Bay of Islands, in New Zealand, which had been fixed upon as the rendezvous of the squadron upon its return from the Antarctic.

On the night of the 1st of January, 1840, the wind freshened and the weather came on thick and misty. Before morning the tender separated from the rest of the squadron, and was unable to come up with them again. She cruised about for upwards of a month, visiting Macquarie and Emerald Islands, and on the 5th of February commenced her return voyage to the Bay of Islands, where she arrived on the 9th of March. On January 3 the *Peacock* separated from the *Vincennes* and *Porpoise*, and on discovering this, Lieutenant Hudson steered for Macquarie Island; but leaving this island, and proceeding south, he again fell in with the other two ships.

Icebergs were first encountered by the squadron in latitude 61° 08′ S. and longitude 162° 32′ E. Expectation was all the while on the *qui vive;* and on January 13 Lieutenant Ringgold, in command of the *Porpoise*, then in latitude 65° 08′ S. and longitude 163° E., judging from the great number of sea-elephants, the discoloration of the water, the dark earth-colored veins and dusty

appearance of the icebergs, and the hoarse cry of innumerable penguins, thought he had discovered land, and fancied that he saw something like distant mountains to the southeast. Soundings of one hundred fathoms, however, gave no bottom, and the dense masses of floe-ice prevented any nearer approach. But on the 16th of January appearances of land much darker and altogether different from ice islands were discovered from all three vessels. Accordingly they pursued a westerly course, skirting the icy barriers that shut them out from the frozen regions of which they caught frequent glimpses. Repeated but vain attempts were made to effect a landing. Wearied with cold and fatigue, and worn out with excitement, they still persisted. On the 24th and 25th of January the *Peacock* lost her rudder, her bulwarks were partially torn off, and she was otherwise so seriously disabled that her commander decided to return forthwith to Sydney, where he arrived in a shattered and sinking condition on the 21st of February. The *Vincennes* and *Porpoise* kept on to the west, and on the 30th of January the former discovered Piner's Bay, so called by Wilkes, in latitude 66° 45′ S. and longitude 140° 02′ 30″ E. The name of Antarctic Continent was now for the first time given to the newly-found land. On February 14 the progress of the *Porpoise* was checked by an immense wall of ice trending far to the north, and she then commenced her return voyage, arriving at the Bay of Islands on the 26th of March. The *Vincennes* was stopped by the same barrier on February 17, whereupon she likewise steered for New Zealand; but unfavorable winds cut her off, and so she proceeded to Sydney, where she joined the *Peacock* on the 11th of March.

On overhauling the *Peacock* at Sydney it was found that extensive repairs would be necessary. She therefore remained at Sydney, with orders to follow the squadron to Tongatabu, while the *Vincennes* sailed for New Zealand on the 19th of March. In the morning of the 30th she entered the Bay of Islands, where she found the *Porpoise* and *Flying Fish,* and the scientific corps, looking for her with great anxiety. The *Peacock,* having completed her repairs and replenished her stock of provisions, sailed from Sydney on the same day for the Tonga Islands. The other vessels left the Bay of Islands on April 6. Propitious breezes wafted them rapidly on their way, and no incidents of special importance occurred on the passage. On the 24th they came to anchor off

Nukualofa, the principal town on Tongatabu, and on the 1st of May they were joined by the *Peacock*.

Early in the morning of the 4th of May the squadron got under way again and sailed out of the harbor of Nukualofa. The *Porpoise* was then detached, under the command of Lieutenant Ringgold, with orders to proceed to the eastern group of the Fiji Islands, and to examine and survey the long line of islets and reefs extending to the north, between the 178th and 179th meridians. The other vessels pursued a northwesterly course towards the main Fiji group, and on the 8th of May the *Vincennes* and *Peacock* came safely to anchor in the harbor of Levuka, on the east side of the Island of Ovalau. The *Flying Fish* did not arrive until the 11th, having been delayed in her passage by running on a coral reef off the Island of Nairai and carrying away a portion of her false keel. Preparations were forthwith made, upon the arrival of the vessels, to proceed with the examination of the islands and to make an accurate survey of all the reefs, coasts and harbors.

Shortly after the arrival of the squadron a prominent native chief, Vendovi, who had been one of the chief instigators and actors in the murder of a part of the crew of the American brig *Charles Doggett* several years previous, was captured by the address of Lieutenant Hudson.[7] This had the effect of intimidating the natives to some extent, and the friendly footing established by Wilkes with the king of Ambau served for a long time to protect American vessels and their crews from molestation. As was natural, however, the many new articles which the savages saw excited their cupidity; and on the 12th of July a cutter was lost on the reefs in Sualib Bay, twenty-five miles east of Mbua Bay, in the Island of Vanua-Levu. Parties of natives had been hovering along the shore all day, and when they discovered that the cutter had grounded, they rushed forward and captured it with everything it contained, except the arms and the chronometers, with which the crew succeeded in making their escape. Restitution and prompt satisfaction were forthwith demanded by Wilkes. After some parleying the boat was restored, but not the property. Becoming satisfied from the numerous prevarications of the natives that they were trifling with him, Wilkes ordered Lieutenant Hudson to

[7] Vendovi was brought a prisoner to the United States, where he sickened and died. His skull is still numbered among the trophies of the expedition.

land with an armed force and destroy the town of Tye, on Sualib Bay, where the natives concerned in the outrage were known to have collected. This was accomplished on the 13th of July. The natives were driven from their *koro,* which contained about sixty houses, and the buildings were then fired and burnt to the ground. Several chiefs were captured, but not having been implicated in the outrage, they were restored to liberty.

This summary chastisement prevented any further acts of aggression in that quarter; but on the 24th of the same month a still more lamentable incident occurred on the Island of Malolo. Strict orders had been given by the commander with regard to intercourse with the natives. On the morning of the 24th Lieutenant Underwood went ashore from the first cutter of the *Vincennes* to obtain provisions; but unfortunately he neglected to take with him a sufficient number of men and weapons. On discovering that the natives manifested symptoms of hostility, a hostage was seized and brought on board the cutter, who was to be detained while the party were engaged in bartering with the natives. Considerable time was spent in chaffering, and the natives gradually surrounded the little party under Lieutenant Underwood. Meanwhile the latter was joined by Midshipman Wilkes Henry in a canoe. A few attempts were made by the hostage to escape, and finally he succeeded in plunging into the water, whereupon he at once struck out for the shore. Several shots were fired at him, but with no effect.

This served as a signal for the natives to attack. Lieutenant Underwood and his party kept the natives at bay, and attempted to retreat to the boat. But the savages pressed them hard, using their clubs and spears with great dexterity. Both Lieutenant Underwood and Midshipman Henry defended themselves gallantly, but were at length knocked down and killed. Others of the party were severely wounded, but none fatally. Lieutenants Emmons and Alden, who had witnessed the beginning of the fray from the cutter, instantly pulled in to the shore in their small boats; but they were too late to rescue their companions, and had only the melancholy satisfaction of recovering the dead bodies.

On the receipt of this sad intelligence Wilkes promptly determined to chastise the murderers in a manner that would long be remembered. The bodies of the ill-starred officers were first buried on one of the deserted islands of the group, and the cutters

and boats of the squadron were stationed around Malolo in order to prevent the escape of the natives. This being done, the Americans landed on the island and destroyed the two towns. About sixty of the savages were killed and a great number wounded. Of the Americans, only one was wounded, and he not dangerously. The next day the rest of the natives appeared before Wilkes and sued after their own abject fashion for mercy and forgiveness. This was accorded, but accompanied with a wholesome admonition for the future. Needless to say, the Americans were not again molested during the remainder of their sojourn in this vicinity.[8]

On August 10, the squadron, having completed the numerous surveys in the Fiji group, separated for a brief period, to meet again early in October at Honolulu. As the time for which the crews had originally engaged was about to expire, they were now reshipped, with a few exceptions, for an additional period of eighteen months, and the complements were filled by the temporary employment of a suitable number of *kanakas*, who were to be discharged on the return of the squadron from the northwest coast of America. The *Porpoise* (Lieutenant Ringgold) sailed on the 16th of November to make a re-examination of the Paumotu group, and on the 2d of December the *Peacock* and *Flying Fish*, under Lieutenant Hudson, took their departure, to resurvey a part of the Samoan group and to look for doubtful islands to the north and west. The *Vincennes* remained in the Hawaiian Islands during the winter. On the 24th of March, 1841, the *Porpoise* rejoined the flagship at Honolulu, and on the 5th of April they set sail for the American coast. They were favored with a pleasant passage, and on the 2d of May came to anchor at Port Discovery.

On the succeeding days they continued to advance into Admiralty Inlet, and on the 11th reached its extremity and moored off Fort Nisqually. From this day until the 17th of June their time was passed in various scientific experiments at Nisqually and in expeditions to explore the neighboring prairies and rivers, particularly the Columbia and its tributaries. The *Vincennes* and *Porpoise* then removed from Nisqually to Dungeness, an anchorage within the Straits of Juan de Fuca, for the purpose of surveying

[8] The same cenotaph at Mount Auburn which records the names and death of Midshipmen Reid and Bacon of the *Sea Gull* tells also the story of this massacre at Malolo.

the winding creeks and inlets of the bay; and while lying at this place Wilkes received the disastrous news that the *Peacock,* whose non-arrival had for some time caused him great anxiety, had been wrecked at the mouth of the Columbia. On the 3d of August the *Vincennes* and *Porpoise* put to sea from Dungeness, and on the 6th arrived off the mouth of the Columbia. Here they were joined by the *Flying Fish,* on board of which was Lieutenant Hudson, from whom Wilkes now received the report of the late misfortune.

It appeared that after departing from Oahu, eight months before, the *Peacock* and *Flying Fish* had continued for several weeks cruising to the southward. On the 28th of January, 1841, they discovered an island, previously unknown, lying to the north of the Samoan group, which Lieutenant Hudson named Bowditch Island; and on the 6th of February the *Peacock* arrived off the island of Upolu and anchored in the harbor of Apia. On the 6th of March they left the Samoan group and stood to the northwest, and on the 14th they made the most southerly island of the Ellice group. They continued their course in the same direction for nearly two months, during which time they touched at most of the small islands comprising the Ellice and Gilbert groups. The natives, who appeared a remarkably warlike and ferocious race, had repeatedly been guilty of insulting behavior to their visitors, and had more than once shown a very suspicious wish to decoy them into situations unfavorable to defence. At length one of the *Peacock's* seamen, who had gone ashore to visit a town named Utiwa, failed to reappear on board. Every inquiry was made without effect, until no doubt remained of his assassination by the natives. Lieutenant Hudson then resolved to punish the outrage, and on the 9th of March he sent his boats ashore with orders to destroy Utiwa. They were opposed in landing by a flotilla of canoes, which they dispersed with a loss of twelve men killed, after which they burned the town, and returned on board without having been able to find any traces of their unfortunate shipmate.

On the 8th of May, being then nearly in the latitude of the Hawaiian Islands, Lieutenant Hudson resolved to proceed at once to his rendezvous in the Columbia. On the 17th of July he arrived off the mouth of that river. The bar at this place was well known to be extremely dangerous of passage, but there was no pilot to be procured at the time. Lieutenant Hudson, however, being considerably behind the time fixed for his presence, and having with

him certain written instructions upon which he considered himself justified in relying, resolved to make the attempt. Accordingly, on the 18th the *Peacock* stood for the shore. But although every possible precaution was taken, she struck upon a shoal and remained immovably grounded. It was soon discovered that her situation was hopeless. On the 19th her crew reached the land without loss, though not without considerable difficulty and danger; and on the morning of the 20th it was found that the ship had gone to pieces in the night.

The loss of the *Peacock* made it necessary to alter, in some degree, the general plan of the expedition. The *Vincennes,* under Lieutenant Ringgold, was immediately dispatched to San Francisco, while Wilkes, with the *Porpoise* and *Flying Fish,* passed the bar and anchored off the town of Astoria. His first care was to provide a vessel for the crew of the *Peacock.* An American merchant brig, then lying in the river, was purchased and named the *Oregon,* and placed under the command of Lieutenant Hudson. While the necessary alterations were being made, the *Porpoise* and *Flying Fish* explored the Columbia as far as Fort Vancouver, where they remained from the 28th of August to the 14th of September. They returned to Astoria on the 1st of October.

The three vessels then stood to the southward and arrived in San Francisco Bay on the 19th of October, where they found the *Vincennes* at anchor. Lieutenant Ringgold, who had arrived in the bay on the 14th of August, had already made considerable progress in exploring the Sacramento River, and in a few days everything was in readiness for the final departure of the squadron from the Northwest Coast. On the 22d of October the four vessels left the harbor, and on the 17th of November they reached Honolulu. On the 27th the squadron again put to sea. The *Vincennes* and *Flying Fish* parted company from their consorts, and, standing to the westward, entered the Sea of China, and on the 13th of January, 1842, anchored in the Roads of Manila. On the 21st they left Manila. The *Vincennes,* parting company with the tender, crossed the Sulu Sea to the southward, and on the 3d of February anchored off the town of Soung (Sulu), the capital of Sulu.

On the 12th of February the *Vincennes* left Sulu, passed to the westward of Borneo, and anchored on the 19th in the Road of Singapore, where she found the *Porpoise, Oregon,* and *Flying Fish.* At this place the *Flying Fish* was reported unseaworthy,

and was, consequently, to the great regret of the whole squadron, disposed of by public sale. At Singapore various surveys and treaties occupied the attention of Wilkes for some time; and after sojourning a month, the squadron again weighed anchor and steered for its final destination in the United States. With the arrival of the ships in New York harbor in July, 1842, the cruise of the Wilkes Exploring Expedition terminated.

RESULTS: 1842-1876

From this expedition, which had been so completely fitted out, great results were naturally expected. Of the labors of the naval officers too much cannot be said. The number of islands surveyed was about 280, besides which 800 miles on the streams and coast of Oregon were surveyed, and 1500 miles laid down along the land and icy barrier of the Antarctic Continent.[9] Numerous islands of doubtful existence were looked for, shoals were examined, reefs discovered and laid down, harbors surveyed and many for the first time made known, and the latitude and longitude of the points visited were determined with all possible precision. Very many doubtful points in the geography of the Pacific were thus cleared up, and the expedition was prepared to supply our navigators with the most complete map of that ocean ever published. A few unknown islands were also fallen in with. Observations with the magnetic needle, thermometer, and barometer were constantly made throughout the cruise. The deep-sea lead, with a self-registering thermometer attached, was sent down in the various seas traversed, and many interesting facts were observed which threw light upon the upper and under currents of the ocean. Observa-

[9] Unfortunate controversies have arisen at intervals during sixty years as to the reality of Wilkes' discoveries of land, and as to the justice of the claim he made to the discovery of the Antartic Continent. Some of the land claimed at the eastern end of his route has been shown by later expeditions not to exist; but there can be no doubt that Wilkes saw land along the line where Adélie Land, Kemp Land, and Enderby Land are known to exist, even if the positions he assigns are not quite accurate. As for the priority of discovery which was claimed at the time by the commander of the French expedition (Dumont-D'Urville), that question would seem to be settled once for all in favor of Wilkes by the able discussion of Rear Admiral Pillsbury, entitled "Wilkes' and D'Urville's Discoveries in Wilkes Land." (See Naval Inst. Proc., June, 1910, Vol. 36, pp. 465-8.)

tions were also made on shooting stars, the zodiacal light, the aurora australis, tides, the course and rotary character of gales, etc.

On the part of the civilian scientific corps, the manners and customs, mode of life, superstitions and religious observances, traditions, etc., of the peoples met with, received constant attention, and complete collections were made of their implements, manufactures, articles of dress, etc. The portfolios of the artists were rich in scenes of every kind, illustrating the islands or regions visited. About 1000 species of birds were collected, and double that number of ornithological specimens. The following is a list of the number of species collected in the other departments of zoology:

	Total No.	New Species
Fishes	829	250
Reptiles	140	40
Crustacea	900	600
Insects	1500	500
Shells	2000	250
Zoophytes (exclusive of corals)	300	200
Corals	450	100

Ten thousand species of plants and upwards of 50,000 specimens constituted the herbarium of the expedition. Besides dried specimens, 204 living plants were brought home and placed in the greenhouse in the yard of the Patent Office, along with many others raised from seeds. The kinds of seeds obtained amounted to 1156. Many of the plants procured by the expedition were soon to be found growing in the various greenhouses of the country, as also in England and the continent of Europe. Specimens of different woods were also preserved. Colored drawings of 180 species of plants were beautifully executed by the artists of the expedition.

But besides the observations in the departments of zoology and botany, at which we have briefly glanced, particular attention was paid to the geographical distribution of plants and animals. On this subject, which was exciting so much attention at the time, many important facts were obtained. The regions examined by the expedition were also highly interesting from a geological point of view. The collections in this department contained sets of specimens from all the regions visited, including gems, gold, and iron ores from Brazil, copper and some of the silver ores of Peru and Chile, besides others illustrating the general geological structure of those countries.

The official publication of the reports of the expedition was begun under the act of Congress approved August 26, 1842. The first two sections of this act read as follows:

1. That there shall be published, under the supervision and direction of the Joint Committee on the Library, an account of the discoveries made by the exploring expedition under the command of Lieutenant Wilkes, of the United States Navy; which account shall be prepared with illustrations, and published in a form similar to the voyage of the *Astrolabe*, lately published by the government of France.[10]

2. That when such account shall have been written, and the illustrations for the same shall have been prepared, an advertisement shall be inserted in the papers publishing the laws of the United States, inviting proposals for printing copies of the same for the United States, to be delivered to the Librarian of Congress in a time and at a price to be stipulated in such contract; and the contract shall be made with and given to the person offering and giving sufficient assurances to perform the work at the lowest price; and on such contract being made, the "account" shall be delivered to such contractor.[11]

In December following the date of the above act, Congress appropriated $20,000 for the prosecution of this work. Other appropriations, ranging in amount from $9,000 to $30,000, were made from time to time, and were absorbed in the publication. The total expenditure on the work up to January 31, 1859, was $279,131.34. But about that time the Library Committee refused to ask for any further appropriation to carry the publication to its conclusion. And when the Civil War broke out, no further thought was given to this work. When the country was again quiet and prosperous the Library Committee which had formerly been interested in the publication had passed away. Mr. Howe, of Wisconsin, who was made chairman of that committee in 1873, admitted that he was not sufficiently informed upon the matter to act intelligently. In consequence of this, the publication of the work was stopped, and it remains uncompleted to the present day.

In the discharge of their duty under the original act providing for this publication, the Library Committee made a contract with

[10] Early in the year 1837 a copy of this work had been sent by France as a present to our Government. The voyage was made in the years 1826-1829, in the corvette *Astrolabe*, Captain Dumont D'Urville, with eighty persons, all told. Its objects were to explore some of the principal groups of islands in the Pacific which the *Coquille* had passed by hastily, and to augment as much as possible the mass of scientific documents obtained by this vessel in the years 1822-1824.

[11] Stat. at Large, V, 534.

Mr. C. Sherman, of Philadelphia, for the printing of 250 copies of this work. Of these, 100 were designated for the Government, in compliance with the law referred to, while the remaining 150 copies were to become the property of the authors of the respective volumes, provided they paid a ratable proportion (namely, three-fifths) of the expense for presswork and paper. The first five volumes to be published, and which appeared in 1844, contained the Narrative of the expedition, as related by Lieutenant Wilkes. This Narrative, which was accompanied by a small atlas, contained a full, though diffuse, account of the details and incidents of the voyage, and afforded the reader a general idea of the work performed and the results obtained.[12]

Few persons will, however, be encouraged to peruse the ponderous volumes comprising this Narrative, since much that is irrelevant has been combined with much that is deeply interesting, and the latter, both in matter and form, exhibits more eagerness for accumulation than skill in arrangement. An expurgated edition of the Narrative, edited in a scholarly manner, is a desideratum of our naval peace history. The liberal contributions made to the Narrative by friends of Wilkes, together with the free use made of the private journals of other members of the expedition, has given to this work a variegated style, which detracts considerably from the excellent typographic execution. Indeed, in mechanical finish the Narrative surpassed any large work ever before published in the United States. It is filled with steel engravings and woodcuts, executed in the most perfect style, and appropriately illustrating the course of the story.

Turning now to the other permanently valuable results of this enterprise, namely, those which were to be embodied in the scientific reports of the expedition, we find that the original estimate of this portion of the work was calculated for ten volumes of text and nine volumes of plates. Further examination of the collections, however, showed that at least nineteen volumes of text and eleven atlases would be needed. These scientific reports were to be worked up, as far as possible, by the scientists of the expedition. But they were greatly hampered in their work, so much so, in fact, that the last published volume made its appearance as late as the

[12] This Narrative was copyrighted by Wilkes, notwithstanding the fact that the instructions issued to him just before the expedition sailed plainly contemplated the surrender of all publication rights to the Government.

year 1874 (more than thirty years after the return of the expedition). The published volumes comprise the following:

Ethnography and Philology. By Horatio Hale. 1846.
Zoophytes. By James D. Dana. 1846. With folio atlas.
Mammalogy and Ornithology. By John Cassin. 1858. With folio atlas.
Races of Man and their Geographical Distribution. By Charles Pickering. 1848.
Geology. By James D. Dana. 1849. With folio atlas.
Meteorology. By Charles Wilkes. 1851.
Mollusca and Shells. By Augustus A. Gould. 1852. With folio atlas, 1856.
Crustacea. By James D. Dana. 1853-55. 2 Vol. With folio atlas, 1855.
Botany.—Phanerogamia. By Asa Gray. Part I. 1854. With folio atlas, 1856.
Botany.—Cryptogamia: Filices, including Lycopodiaceæ and Hydropterides. By William D. Brackenridge. 1854. With folio atlas, 1855.
Botany—Cryptogamia: Musci, by W. S. Sullivant; Lichens, by Edward Tuckermann; Algæ, by J. W. Bailey and W. H. Harvey; Fungi, by M. A. Curtis and M. J. Berkeley; Phanerogamia of Pacific North America, by John Torrey. Edited by Asa Gray. 1874.
Herpetology. Prepared under the superintendence of S. F. Baird, by Charles Girard. 1858. With folio atlas.
Hydrography. By Charles Wilkes. 1861. With two folio atlases, 1858.

The niggardly publication of these scientific reports merely served to tantalize the votaries of science. The infinitesimal edition authorized by Congress could hardly have been ordered on the score of economy; for the additional charges of an ample impression would have been only the trifling cost of paper and presswork (and in some cases the coloring of plates), the expense of typesetting and engraving having been equally incurred for this small number of copies. It would seem, indeed, that a pitiful pride had something to do in limiting the number of copies, so as designedly to give them the adventitious value of great rarity.

It remains only to chronicle several unofficial accounts of this great undertaking before finally taking leave of the subject. In 1843 there appeared a work entitled, "Thulia: a Tale of the Antarctic," by James Croxall Palmer, one of the medical officers attached to the expedition, and who afterwards became Surgeon General of the Navy. The main facts, and particularly the notes and appendix, of this volume (which, by the way, is written in verse) were gathered from the log-book and journals of the

Flying Fish, and also from the author's personal experience aboard the *Peacock.*[12]

Joseph G. Clark, in his "Lights and Shadows of Sailor Life," published in two editions in 1847 and 1848, also gave an account of the more thrilling events of this expedition; and Rear Admiral George M. Colvocoresses' narrative, entitled, "Four Years in the Government Exploring Expedition Commanded by Captain Charles Wilkes," went through five editions in the four years from 1852 to 1855.

CONCLUSION

This forgotten chapter of our naval history represents one of the glorious achievements of our navy in times of peace. It affected materially the subsequent careers of Rear Admirals Cadwalader Ringgold, S. P. Lee, T. T. Craven, Augustus L. Case, G. F. Emmons, and William Reynolds, and Captain Samuel R. Knox. Moreover, it influenced in a noteworthy degree the lives of at least three distinguished men of science—James D. Dana, Charles Pickering, and Asa Gray. On these grounds, as well as on account of the present widespread interest of our country in the problems of the Pacific, this brief sketch of the South Sea Exploring Expedition has been drawn up for permanent record.

[12] A later revised edition, with additions, was published in 1868 under the title, "Antarctic Mariner's Song."

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE SAFETY AND WELFARE OF THE WORKMAN

By Rear Admiral A. B. Willits, U. S. Navy (Retired)

The great change that has come over the industrial world during the last decade, through a closer study of the potent factors in efficiency, has manifested itself not only in improved methods of operations and in systematic conservation of time and material, but also, most seriously, in matters pertaining to the welfare of the workman and to the elimination of the danger from his occupation.

That a marked improvement in general efficiency should follow proper provision for the cleanliness, safety and hygienic comfort of those who work in shops, is far less surprising than that recognition of this natural and close relationship between welfare and output should have been so tardy, or that the dangerous, unhealthful and depressing surroundings commonly existent in the shops of not so many years ago, should have been so persistently ignored.

As popularly understood, the terms *safety* and *welfare* are quite fully covered by such alterations in and additions to the old-style surroundings of the workman as will insure him adequate protection against injury while in the pursuits of his vocation, and will provide for him during such work, ample heat, light, ventilation, pure drinking water and sanitary toilet facilities. Indeed it was to these features alone that the Navy Department directed special attention some two years ago, and it was then found that the needed correction of defects and supplying of deficiencies along these lines were surprisingly many.

In the opinion of many advanced thinkers on this subject, the term welfare has a deeper meaning and covers a wider field than is indicated above, extending even into the æsthetic atmosphere

generally scorned by the practical foreman; but while this field should not be cultivated until after graduating from the primary school of safety and welfare, therein will be found benefits as absolute and as mutual as any that have resulted from work done in the more familiar territory.

In order to get a clear idea of the whole subject and especially as to what has already been accomplished through systematic effort, we must first make the acquaintance of an affiliated group of associations which had its origin about 26 years ago in little Holland and has been spreading, since then, throughout the civilized world. The members of this group have titles variously phrased to signify safety and welfare, and have for their common object the most comprehensive and inclusive one of any association in the world, this being *the conservation of human life and health.* That 14 foreign nations should have been pushing such a humanitarian enterprise, under the inspiration and direction of men and minds devoted to the uplift of the industrial workers in matters pertaining to their health, safety and happiness, and that one thriving branch had existed in New York City since 1911, would seem to be a reason for a more general knowledge of the information and data thus made available; yet it is quite safe to say that prior to the following incident occurring in 1912, few naval officers had even heard of the museums of safety or of the American branch.

In carrying out the duties of director of navy yards, 1912, the writer found great need of a more systematic attention to the matter of safeguarding the danger points of shops and machinery at the various navy yards and stations and early secured the department's directions to each commandant to properly advance this through such recommendations as would follow a monthly inspection of all shops, by a board composed of the captain of the yard and all the principal foremen. This kind of inspection was carrying out an idea obtained from the Midvale company for securing criticism of each shop by foreman of other shops with eyes fresh to the scene and not overfamiliar with its particular arrangements; there having long been recognized to exist a sort of shop hypnotism which, at times, blinds those in daily contact with set conditions, to some defect quite obvious to some other experts.

The head of the board at the Philadelphia Yard (Captain E. A. Anderson, U. S. Navy) took an unusually keen interest in

the matter and cast about for some outside source of information on the latest forms of safety devices. Learning something of the Museum of Safety in New York he visited that institution and made his needs known to its director, Dr. Wm. H. Tolman, and from this visit there resulted an almost immediate distribution to the navy yards of our country such data and illustrated information on the subject at issue as would have taken years of individual investigation to have accummulated. Dr. Tolman not only visited the Philadelphia Yard and made close inspection with Captain Anderson, but furnished him with numerous photographs of the most modern safety appliances, and also delivered a free illustrated lecture at that yard, to those officers and men interested enough to attend, on the subject of safety and sanitation. Through efforts of the department, Dr. Tolman was induced to repeat this lecture at other yards within reasonable reach, and this he did without remuneration except for actual expenses. Following this there naturally sprang up a close correspondence between the director of navy yards and the museum, leading to a visit to the museum in January of last year (fortunately at the time of the annual meeting of the institution) through which the full scope of the work being done was brought to an appreciation which has prompted the writing of this article.

THE AMERICAN MUSEUM OF SAFETY

At the present time this museum is one of but 24 similar institutions in the world. England is about to come into line, at London; but the list, as it now stands, is as follows; Holland having been the first and New York the twelfth in actual formation:

Austria: One in Gratz, Steiermark.
Belgium: One in Brussels.
Canada: One in Montreal.
Denmark: One in Copenhagen.
Finland: One in Helsingfors.
France: Two in Paris.
Germany: One in Berlin, one in Würzburg, one in Dresden, one in Munich, one in Frankfort-on-the-Main.
Holland: One in Amsterdam.
Hungary: One in Budapest.
Italy: One in Milan.
Russia: One in Moscow, one in Odessa, one in St. Petersburg.

Spain: One in Barcelona.
Sweden: One in Stockholm.
Switzerland: One in Zürich, one in Lausanne.
United States: One in New York, one in Boston, Mass., one in San Francisco.

The museum in New York City occupies limited space in the building of the United Engineering Societies, No. 29 West 39th Street. It was organized in 1908, just 20 years after the movement was started in Holland, and was incorporated in 1911 under a special charter from New York State. It is supported entirely by voluntary subscriptions and membership fees, although, in view of the great value of its work to the community at large, it would seem that it should have hearty aid from the state. During the brief period of its existence it has made the most wonderful strides in the enlightenment of employers and employees in the subjects of safety and hygiene, and also in investigating the causes of accident and disease involved in the various vocations of workmen and supplying the needed corrective and preventive data and information.

As noted above, these museums are all affiliated, exchanging all information of value secured and meeting each year, by representatives, for the discussion of papers and exchange of views. It is thus obvious that the fund of information available at our own museum is the combined results of the investigations of hundreds of active, specialized minds throughout the world, and cannot fail of being the utmost value to the shop, the home and the individual.

In attempting to properly carry out such an inclusive object as these institutions have in view it becomes necessary, of course, to systematically subdivide the work into sections, and the four principal sections of the American Museum, last year, were

Iron and steel,
Chemical industries,
Education,
Hygiene,

the latter being again subdivided into

Lighting and ventilation,
Factory and construction,
Housing,
Food and water,

Sanitation and occupational diseases, including dust prevention,

Care of sick and injured,

Sewage; refuse and garbage disposal.

Under all these headings work constantly progresses in securing data and information on the latest and best methods for improving industrial conditions; and statistics, models and full explanations are always freely available at the museum, covering all that has been done on these lines throughout the world.

It was stated that 3,000,000 of our workers suffer periods of illness each year from industrial causes of a *preventable nature;* through effects of poisons, dust, fumes, smoke, poor light, bad ventilation, impure water and faulty sanitation, and the president of the institution estimated that at least one-half of the 25,000 fatal accidents which annually occur in the United States, can be averted by proper instructions and easily installed devices.

One can readily see that such an enterprise as this has an unlimited scope and boundless room for expansion and that it will find an ever-increasing multitude eager to utilize the definite results of its investigations. Its practical utility has already been demonstrated, not only by the little incident of its aid to the Navy Department, but by the manner in which it has been recognized by state departments and commercial institutions. Probably this is best shown by quoting some extracts from the address of President Williams last January:

The museum has co-operated with the various State Departments of Labor. For example, a week's campaign was conducted in Minnesota, with the Commissioner of Labor, for the purpose of arousing interest in accident prevention in that state: The present activity in Minnesota may be directly traced to the Americon Museum of Safety.

Commissioners of labor from other states have made frequent visits to the museum for study and inspiration. The commissioner frm New Jersey, with his inspectors, have spent much time at the museum taking copious notes and securing working drawings of various devices, photographs and lantern slides. The resources and the personal services of the museum's staff were freely placed at the service of these gentlemen.

The Department of Labor of the State of New York is using the museum as a training school for its inspectors, where the latest and best methods for safeguarding machines and dangerous processes may be studied. Candidates for positions as state factory inspectors closely studied the collections in preparing themselves for the civil service examinations. The museum is, in fact, the only training school in the United

States where factory inspectors may prepare themselves for their responsible positions.

Inspectors employed by the great casualty insurance companies have similarly used the museum. In one instance, the Travelers Insurance Company, at considerable expense, ordered their inspectors from all over the country, to assemble at the museum for the special study of its collections.

Many leading industrialists have sent members of their staff, managers and superintendents, to the museum for similar investigations. One large iron and steel company made four special visits, through representative bodies made up of its foremen and selected workmen. So rich were these study visits that the company has incorporated them in its policy for prevention of accidents in its works.

The American Museum of Safety possesses the finest specialized Library on Accident Prevention and Industrial Hygiene in America. Last year its resources were greatly enriched by specialized exhibits, in the form of models, collected by the director, concretely illustrating occupational diseases and industrial poisons. This collection is unique and forms the basis of the section of industrial hygiene, and of which our country may well be proud.

Sir Arthur Whitelegge, His Majesty's chief inspector of factories, made a special visit to the museum last year. He was so impressed with the practical character of the work that he will use it as a model for the London Museum of Safety, for which a site has already been selected.

By formal authority of the New York Board of Education, class room instruction in safety and caution, illustrated by simple models, is now being given to the 770,000 children in the public schools of the city, showing the children how they themselves are largely responsible for the increasing number of street accidents and how they may avoid these perils. In conference with the school authorities this instruction will be extended by evening courses, to the 40,000 pupils who annually leave the public schools to go to work. Every young worker will be given a certificate based on examinations, showing that he has been trained in safety and self control. In this way the museum will refute the contention of so many employers that workmen will not make use of the safeguards provided them, and will be instrumental in equipping prepared workmen.

Five gold medals are placed at the disposal of the museum for annual award: The *Scientific American* Medal for the most efficient safety device invented during the preceding three years and exhibited at the museum; the Travelers Insurance Medal, to the American employer who, in the judgment of the museum, has done most for the protection of the lives and limbs of workmen; the Louis Livingston Medal for the best progress and achievement in hygiene and sanitation and the mitigation of

occupational diseases; the E. H. Harriman Memorial Medal (founded by Mrs. Harriman) to the American Steam Railway having the best record in accident prevention and hygiene effecting the public and its own personnel, during the current year; and, finally, a gold medal known as the Rathenau Gold Medal of the *Allgemeine Electrictaets* of Berlin, for the best device or process in the electrical industries for safeguarding industrial life and health. This latter is one of the few instances where the bestowal of a high European honor is made through an American institution.

OUR OWN NAVY YARDS

Having reviewed the work done in the outside world in improving industrial conditions let us look at our own navy yards. The principal fault with these establishments lies in the manner in which they have been built up. During the long period of separate bureau control of all their shops and work there was no attempt to secure a homogeneous arrangement of buildings looking to economy in total work done at a yard. Each bureau was merely responsible for its own output and expenditure of its own appropriations without thought of economic possibilities which would result from consolidation, and the result appears in a heterogeneous assembly of buildings quite incongruous with modern ideas and few of which are excellently adapted to present needs, in all respects. To pull these down and rebuild, in proper sequential locations and up-to-date proportions, would require appropriations far beyond the power of the department to secure or to conscientiously ask for, and therefore the continued effort is in line of consolidation of work, so that there will be, generally, but one shop in each yard devoted to one class of work; and in segregating the classes of work so as to make routing short and appropriate. Necessary alterations are many and have to be accomplished as funds are obtained, and it is not at all an easy matter to make the necessities appear reasonable to the Congress: especially as we are doing good work and apparently meeting all demands with the shops as they are. How much time and thought has been given by those in charge of yard departments, in order to make the little improvements, which are at times possible, count towards a finally consistent arrangement, will never be known, but this is all that has been practicable except in very few

cases or when some providential fire has wiped out an obsolete building and permitted suitable replacement. Even then it has sometimes been a slow and tedious process to obtain the money needed for proper rebuilding. To the lay observer, the buildings of our yards look good enough, and their number more than ample.

We are, however, making progress all the time in spite of the drawbacks and in the matters of safety and welfare have followed the inspiration of the museum with satisfaction and to a most reasonable extent. Many of our shops, nevertheless, are poorly lighted and far from ideal in every way, through inherent faults of their construction; but we know what we need and will persist in endeavor to bring about a closer approach to model conditions. To the supervisors of work it is plain that every step that has been taken in improving the sanitary conditions and safety of a plant has paid in better work and a more contented spirit in the working forces. The men are elevated in proportion as they are impressed with the efforts made for bettering their conditions, and there is nothing more impressive than the safeguarding of the danger points in shop and operations, and in increasing the healthful atmosphere of the plant by sanitary improvements; so that, independent of the gratification of the humanitarian spirit which incites the welfare activities, we have the satisfactory knowledge that we are gaining in efficiency by the movement.

ADVANCED WELFARE

As men became more enlightened and as education lifts them above the mentally sluggish stream of the ignorant, they naturally raise their thoughts to the attainment of a better social condition than their trades or callings have usually limited them to. The foreman of a shop, or the superintendent of an industrial plant, is no longer looked upon as a superior being, but merely as a fortunate individual holding a position to which each intelligent journeyman conceives himself to be eligible, and to which, secretly at least, he aspires. The degree of illiteracy of men is the great assorter of them into classes and the eagerness displayed by the industrial workers for better education indicates that but few generations will pass before a very general equality in this respect will obtain. To anyone old enough to have studied these conditions during even the past 25 years, it is obvious that the growth of the industrial world in all matters tending to fit it for

social advancement and an appreciation of the higher responsibilities, has been most marked, and those who seriously consider the subject must realize that it is all merely one evidence of the great world uplift that, some day, is to make all human beings sanely equal and comparatively happy.

Now advanced welfare follows up the museum's primary and essential work by aiding in this general uplift of the working forces through their sense of sight and by a gradual educating influence towards bringing about a full appreciation of the benefits and pleasures of cleanliness, both personal and contiguous; so that there shall finally be an entirely different atmosphere in shop, as well as home, through the eradication of the "habit of dirt," and bringing to the employee and the employer manifold benefits through that greater content which will follow inviting surroundings and clean congenial employment.

Two essentials are considered in advanced welfare for accomplishing this purpose or end; the first being

The Embellishment of Shop Environments,

and the second, a more difficult task, yet quite within rational undertaking,

The Elimination of Dirt From Industrial Work.

The embellishment of shop environments is not now a doubtful quantity in efficiency and is rapidly coming to be recognized as an element of mutual advantage. In a very interesting article appearing in the UNITED STATES NAVAL INSTITUTE PROCEEDINGS some short time ago, written by Assistant Naval Constructor C. A. Harrington, U. S. Navy, the following allusion to this appears:

> Navy yards afford the best field of any industrial institutions for the promotion of welfare work, due to the absence of the foreign labor element. These days the up-to-date manager prefers to have a flower garden outside his blacksmith shop than a pile of scrap iron, because he know it pays. A machine shop is a better paying proposition if surrounded by grass than if surrounded by cinders and gravel.

An increasing number of commercial institutions, yearly, are improving shops and grounds to give this cheerful aspect to the toilers, knowing that the eye carries more pleasure to the brain than any of the other senses, if given proper food for its enjoyment, and this direct metaphysical effect is inspiring to every individual not sodden beyond redemption.

There are still many practical men, too busy to study the fine lines in welfare, and too sure that what is already being generally done is all sufficient, who simply smile at the idea of putting money into such adornments and believe that the "bouquet business" is very like throwing pearls before swine, in that the great mass will never appreciate it at all. This view, however, has been proved to be unsound by those who have already had payroll results from every reasonable step they have taken to make the shop surroundings more inviting; and full appreciation has been evidenced, in degrees varying with intelligence. Where environment pleases, labor is more, and not less, productive, and some managers have already gone far in this kind of embellishment with both pleasure and profit, and one of the most satisfactory results of its educating influence is the increased neatness of the worker and their realization of the benefits of a greater cleanliness, and of the depressing influence of dirt, ugliness and delapidation. This leads directly to the second object in advancing welfare; *the elimination of dirt from industrial work.*

If by some magic process we could accomplish this object in one fell stroke a great number of workers would not quickly be recognized by their families. That it would, however, be a blessing to everyone directly or indirectly affected goes without saying, and that the influence of this would soon extend to the home life and surroundings of labor is as undoubtedly true. We can scarcely realize the magnitude of the good such an achievement would bring to the industrial world, for we can scarcely understand that it can be effected. No doubt there would be some who would resent such a change in accustomed conditions in which they would sense a forced alteration in social presentment not altogether pleasing because of the long practice of the habit of dirt; but the time would be brief indeed before the rejoicing would be general and the habit of cleanliness wide-spread and established, at least, as most desirable. We would have little sympathy, too, from the obtuse employers who believe in stolid toil and a grim future. It would be "to laugh," with them, when needed effective changes are suggested, and slow would be their falling into line; but this is the type that must be educated up to the point of proper appreciation and that is why reforms, to be lasting, have to be made slowly and gradually. Publicity as to the reason for each step must be wide, and the good expected must

be brought clearly to the minds of those least liable to understand it through natural intuition. Then the simple means of accomplishing the improvement must be made easy by every assisting factor possible to afford.

We can all remember when it was most ordinary for men who chewed tobacco to expectorate the nauseous juices upon pavement or floor of car or coach, without let or hindrance. It was looked upon as one of the unquestioned accompaniments of the chewing habit, not to be stopped without prohibition of chewing itself. The sidewalks were kept well "blazed" by the trail of a multitude, and the disgusted held their peace. Not many years ago, through the agitation of the boards of health, laws were passed in most cities making it a misdemeanor to expectorate in public places, and a clear notice of the reason for these laws was posted most generously. This publicity of the "why and wherefore" brought forcibly to the attention of the thoughtless offenders the evil effects they were promoting and this, far more than the fear of the penalty attached to the ordinance, brought quick and general refrainment from a continuance of the nuisance. People generally realized the benefits of observance of the law and the traveling public delighted in the consequent clean car floors and street pavements. The actual enforcement of the act was seldom necessary because of the voluntary obedience through a quick education of the masses in the benefits of cleanliness in one single particular. It was an easy lesson, endorsed by popular opinion, and accomplished its end without putting a stop to chewing tobacco either.

Habits of indulgence in any sensuous relation are hard to break, but habits born of simple ignorance or thoughtlessness, and in no way conducive to personal pleasure or gratification, need not be difficult to uproot, but only require patience and a proper publicity, with simple definition of the reasons and benefits involved, and with a clear explanation of the means proposed for the remedy. Now the "habit of dirt" is one which, above all others, should be combated by every practical means possible to apply: It exists so widely and is condoned so liberally that people have come to believe that it is a necessary attribute of mechanical operations, and were one to inspect a machine shop or smithery and find all the workers with clean faces and hands, and with finger nails lacking the subsoil so nearly universal therein, he

would think that he had gone color blind or that little real work was being done in that establishment.

In spite of the pessimist's views that all labor is really obnoxious to the human being, we know that physical work is necessary to our well-being and happiness. In proportion to its cleanliness it is attractive, and in proportion to its "niceties," and competition in the excellence of its accomplishments, is it interesting. Remove dirt from manual occupations and we will find an immense increase in applicants for trade apprenticeship or manual training, and a resultant increase by skilled and unskilled labor, in interest, in competitive superiority, in output. Outdoor sports are clean and competitive and we see the multitude of their devotees. Indoor and outdoor labor can be given some kindred qualtities by a careful study on the part of employers, that will slowly revolutionize its character and brighten its entire aspect.

This is a matter of years, and not of a day, but no delay should occur in its planning or in promoting its progress, for we contend that the existing intimacy between the practical pursuit of most of the mechanical trades and dirt, is not absolutely necessary and has no good reason for its present proportions beyond the force of long habit. Besides being an increasingly depressing influence on the journeyman of average intelligence and aspirations, dirt operates as a barrier to a multitude of young men whose natural proclivities singularly fit them for such callings. The old engineer corps of the navy suffered for many years through this inference and it was not the importance of their vocation but the dirt attached to its following, happily mitigated through intelligent study of the "why," that prevented it from a fuller recognition in social matters long before amalgamation took place and the vital importance of its work gave it its due prominence.

We believe that a simple but serious study of the immediate causes for the existence of dirt in this connection will bring simple remedial means to ready use and appreciation, and will eventually prove of inestimable value to mankind. The sympathetic interest of the worker must be gained through the proper publicity of the why and wherefore to give the movement that momentum that will carry it along to an end meeting the hopes of the most sanguine welfare expounder, after the proper time.

Incidentally, but without the motive prompting it, we have already brought about vastly cleaner conditions in some of the

mechanical trades, through improved methods and material. The use of high-speed steel has made metal cutting much less dirty, and the use of downdraft and oil furnaces has cleansed the air of the smithery of much of its grimy soot. Navy yard shops are, as a rule, much cleaner than the run of outside shops and we may properly consider ourselves in the van of advanced welfare; but there are millions of workers who still suffer from the habit of dirt in more or less realization of its unhappy influence, and sorely need the thoughtful consideration of their employers in a final relief from its burden. The United States will undoubtedly be in advance of the world in the changes for labor benefit indicated here. Our "mental atmosphere" is better suited to this improvement in working conditions.

An Irishman who had spent some years in this country met an old friend at the wharf as he was landing for the first time. Said the newcomer: "Pat, I hear that one man is as good as another in America!" "Yes," said Pat, "and better too."

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE BATTLE OF LAKE CHAMPLAIN

By H. C. WASHBURN, Instructor, U. S. Naval Academy

EVENTS LEADING UP TO THE PLATTSBURGH CRISIS

During the first two years of the War of 1812, while Napoleon kept the British Army campaigning across the seas, the United States had a splendid opportunity to invade Canada or to prepare its forces to resist invasion from the north, for when war was declared the British regulars in the Canadas numbered less than 4500 effectives,[1] and this number was not increased until the summer of 1814.

The American people, therefore, had ample time in which to put in practice their favorite theory of military policy—the fallacy that a small establishment of regulars, whenever the emergency arises, can successfully leaven a large lump of militia and volunteers. Needless to say, the two years of rare opportunity were wasted—by inefficiency of force and misdirection of effort.[2] Raw troops, under incompetent commanders, from Hull to Wilkinson, were thrashed, almost invariably, by small bodies of British regulars trained in many wars. The story of "humiliating surrenders, abortive attacks and panic routs"[3] was relieved only by Harrison's easy victory over a much smaller force at the Thames and the desperate valor of Scott's well-drilled brigade at Lundy's Lane, where General Brown made a gallant stand against formidable odds, winning only a temporary success. On the following day, July 26, 1814, Brown's retirement within the lines of Fort Erie marked the point at which the United States definitely abandoned the offensive on the Canadian frontier.

[1] The Eighth, Forty-ninth, and One Hundredth Regiments, a small detachment of artillery, the Tenth Royal Veteran Battalion, and the Canadian, Newfoundland, and Glengary Fencibles, 4450 men in all.—JAMES.

[2] Mahan: Sea Power in Its Relations to the War of 1812, p. 355.

[3] Roosevelt: Naval War of 1812, Ed. 1910, p. 11.

Meanwhile, by the first abdication of Napoleon, April 11, 1814, and his retirement to Elba, Great Britain was relieved for some ten months, and, as she thought, permanently, of pressure from her great enemy. Fortunately for the Americans, the affairs of Europe were still too unsettled to permit the withdrawal of a very large percentage of British land forces, but Wellington's Peninsular army was sent from Bordeaux to America—one division for coastwise operations under General Ross, the other and larger part to constitute the main body of an army of invasion from Canada under Sir George Prevost. Before General Brown retired to Erie the first four brigades of Peninsulars had arrived on July 12 at Montreal, and by August 25 Prevost's army was complete—29,437 men, exclusive of officers. Of this number, all were veteran regulars except 4706.

Prevost's campaign, an undertaking originally intended for Wellington's command, was well planned to attain its object, the enforced cession of United States territory. Until Perry defeated Barclay on Lake Erie the British had aimed to extend their dominions southward along the Ohio and the Mississippi to the Gulf, cutting off and holding the Great West. To the success of this project the control of Lake Erie was essential, and it is sufficient praise for Perry to say that he made such a momentous campaign impossible. There remained the traditional route followed by Burgoyne, along the Richelieu, Lake Champlain, and the Hudson, and it was this line that Prevost was to take, his first objective being Crown Point. Again, the success of the campaign turned on the control of a lake. Lacking this control, Prevost's splendid army would have its flank exposed for over a hundred miles and its line of communications cut.

Granting that the British naval force on Champlain would whip Macdonough—and this success was expected by the British, since Downie's forces were finally superior—it was inevitable that Prevost would advance to Crown Point, and that he would hold it. Even if he could proceed no farther, the British Government would then be in a position to demand the surrender of the Great Lakes, which were wanted as strictly British waters, a "military barrier"[4] accessible to Americans for purposes of commerce only. Having taken "the chances of the campaign," England was to "be

[4] Memoirs of Lord Castlereagh. Series III, Vol. II, pp. 86-91.

governed by circumstances."[5] In other words, if Prevost could reach Albany, and await there an expedition sent against New York and up the Hudson, Great Britian would compel the cession of a large strip of territory south of the Lakes.

"To the battle of Lake Champlain it was owing that the British occupancy of United States soil at the end of the year was such that the Duke of Wellington advised that no claim for territorial cession could be considered to exist, and that the basis of *uti possidetis,* upon which it was proposed to treat, was untenable."[6]

One brigade of Prevost's army was sent to Kingston, a movement which was sufficient to cause the withdrawal of most of the American army of defence, at Plattsburgh, already seriously inadequate. On the 29th of August General Izard, in obedience to an intimation from the War Department which he interpreted as an order, marched from Plattsburgh at the head of 4000 men for Sackett's Harbor. This detachment of the main army left Macomb to face the impending storm with 1500 effectives—a situation so ludicrous that it would be unimaginable if it had not actually existed. Macomb stated in his official report: "I had commanded a fine brigade which was broken up to form the division of Major General Izard. . . . . Except the four companies of the Sixth Regiment, I had not an organized battalion among those remaining; the garrison was composed of convalescents and the recruits of the new regiments—all in the greatest confusion—as well as the ordnance and stores, and the works in no state of defence."[7] This was the regular force which was to prevent Prevost from reaching Crown Point! Though there had been ample warning of invasion, it was not until September 4, two days before Prevost entered the northern part of Plattsburgh, that Macomb was reinforced by militia—700 men. Before the battle on the 11th, volunteers from the nearby counties of New York and Vermont brought Macomb's entire force up to only 2500.[8] With this ill-assorted handful, he was to halt over 11,000 veterans of the Douro and the Tagus, the Ebro and the Garonne—the men of Torres Vedras and Vittoria. "An unrivalled army for fighting," as Wellington had described them the year before.

[5] Castlereagh to Liverpool, Aug. 28, 1814.
[6] Mahan: Sea Power in Its Relations to the War of 1812. p. 356.
[7] Letter to Secretary of War. Sept. 15.
[8] Macomb's General Order of Sept. 14.

Macdonough, facing under these circumstances the responsibility of retrieving the campaign, found himself, at the last moment, with a force considerably inferior to the British squadron. From June 3, 1813, when Lieutenant Sidney Smith, "without orders and contrary to" Macdonough's "intentions and advice,"[9] had lost the sloops *Eagle* and *Growler* by venturing in chase of a gunboat near the Isle aux Noix, the enemy had been in undisputed control of the lake until May 29, 1814. In the interim, Macdonough wisely selected an easily defensible retreat at Vergennes, Otter Creek, and bent all his energies to ship-building. When he emerged from his winter base toward the end of May and appeared off Plattsburgh, his force, complete save for the new brig *Eagle,* was large enough to dominate the lake, and included the new ship *Saratoga,* 26 guns ("forty days from the living tree to the man-of-war"[10]) the schooner *Ticonderoga,* 17 (a remodelled steamer), the sloop *Preble,* 7, and ten galleys or gunboats, of which six were of 70 tons, armed with two guns, and four were of 40 tons, with one gun. It was supposed that the *Eagle,* 20, built in 19 days, and launched August 11, would give Macdonough the ascendancy, but the British, on August 25, launched a frigate,[11]

[9] Macdonough's Autobiography, Life of M., Rodney M., p. 27.

[10] Same, p. 138.

[11] James's contention that the *Confiance* was "no more a frigate than the American ships *General Pike* and *Madison* on Lake Ontario," is not supported by his countryman, Robert Christie, who speaks of her in his Memoirs of the Administration of the Colonial Government of Lower Canada, etc., published at Quebec, 1818, as follows: "The Commissary General and Quarter-master General, in order to expedite the new frigate . . . ." He also says that "the strongest confidence prevailed in the superiority of the British vessels, their weight of metal, and the capacity and experience of their officers and crews." Two letters, hitherto unpublished, and kindly offered to the writer by Dr. Gordon Claude of Annapolis, for quotation, corroborate the evidence already available that the *Confiance* was much larger than the *Saratoga.* These letters were written on September 16, 1814, by Third Lieutenant John Claude, U. S. Infantry, one of Macomb's officers, and describe both the land and naval engagements. Referring to the latter, Lieutenant Claude writes: ". . . . their heavy ship laying alongside our sweet little brig . . . . When I looked at the difference of their size, I trembled for the little jewel, but she was true American, and damme she poured it in right 'twixt wind and water." He refers to the *Confiance* as "the colossus," and his phrase "the American brig" (by which he means the ship *Saratoga*) "though in size but a boy to a man compared to that of the British ship,"

the *Confiance,* of 37 guns. She carried as her main armament 27 long twenty-four pounders, one of them, a pivot, giving her 14 of these guns to the broadside. Her "superiority in long guns," says Mahan, "would on the open lake have made her practically equal to cope with the whole American squadron . . . . assuming that the *Linnet* gave the *Eagle* some occupation." [12] Besides the *Confiance,* and the *Linnet,* a brig of 16 guns, the British had the sloop *Chubb,* 11, and the sloop *Finch,* 11.[13]

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has all the more weight because he saw the fight from the shore, and was impressed by the difference in size in spite of the fact that the *Confiance* was 400 yards farther away from him than was the *Saratoga.* Macdonough, in his report of May 29, described the *Saratoga* as follows: "She is a ship between the *Pike* and the *Madison* on Lake Ontario." As the *Pike* was of 875 tons, and the *Madison* of 593, most authorities have agreed to accept the mean between these tonnages, 734, as the tonnage of the *Saratoga.* Though this is an unsatisfactory way of estimating her tonnage, to say the least, there is no official record to go by. The *Confiance,* having guns on two decks, is conceded by British authorities to have been of over 1000 tons. She was carried for several years on our navy list in the class with the frigates *Constellation, Congress,* and *Macedonian;* as these were respectively of 1265, 1268, and 1325 tons, the *Confiance* is generally considered to have been of about 1200 tons. The *Essex* rated as a frigate, though she was of 860 tons; H. M. S. *Bellerophon,* 74, a ship-of-the-line, was of 1613 tons; our heaviest type of frigate, the *Constitution,* 1576. The following table compares the *Confiance* with frigates of the second and third classes at that time and with the *Saratoga:*

	Tons	Long guns	Carronades	Weight of long metal	Weight of short metal	Total metal	Crew
Confiance...	1200	28*	10	672	272	944	300
Essex.....	860	6	40	72	1280	1352	255
Macedonian.	1325	32	17	546	530	1076	301
Phoebe.....	1000?	30	16	424	478	902	295
Saratoga....	734?	8	18	192	636	824	240

* Strictly, 27, the pivot making 14 to the broadside and the equivalent of 28, in all.

At the Naval Academy are two 24-pounder long guns taken from the *Confiance.* On the muzzle of one of these guns is inscribed the gunsmith's mark: "1813 *Confiance.*" This evidence indicates roughly, that the British made plans at least eight months before the battle to build the frigate that gave them the preponderance of force on the lake.

[12] Sea Power, etc., p. 371.

[13] These sloops were the captured *Eagle* and *Growler,* refitted.

On August 31 Prevost set out from the Richelieu on his march of invasion, and on September 2 Captain Downie took command of the British naval force at Isle aux Noix. Five days later the *Confiance,* which could not have taken part in the battle had her masts and spars not been furnished by traitorous American citizens, hauled from the wharf into the stream and started for the front, towed by boats against a head wind and the strong current. As her magazine had not been finished by the mechanics who swarmed over her until two hours before the battle, she dragged a bateau stowed with powder. The crew, hurriedly assembled by draughts from different ships at Quebec, were strangers to her officers, and to each other, except for 57 from H. M. S. *Leopard.* Downie and his first lieutenant, Robertson, were unacquainted with the other officers. By the night of the 8th the flagship was anchored off Chazy with the rest of the squadron, and the next day was spent at gun drill.

Downie's unnecessary haste was caused by peremptory letters from Sir George Prevost, who had brushed aside the American militia and Macomb's advanced guard, "never deploying," but "always pressing on in column,"[14] had driven Macomb across the Saranac, and entered Plattsburgh on the evening of the 6th. Prevost was now impatient for Downie's co-operation, not realizing that he was urging upon the naval officer, whose problems he did not appreciate, a haste that might be fatal, and that turned out to be a probable contributing cause of defeat. The season was somewhat advanced, but not so far that a week's delay would have meant very much to Prevost. Even a day or two would have meant a great deal to Downie, handicapped as he was by the unfinished state of his most important ship and the prime necessity of drilling her crew.

Far worse than Prevost's impatience, however, was his blindness to the demands of the situation. Since Downie was compelled to take the offensive, and since he would have the advantage on the open lake, Macdonough had wisely elected to assume the defensive, at anchor, making admirable use of the conformation of Plattsburgh Bay, which would place an attacking squadron at a serious disadvantage. There was but one flaw to make this defensive position short of ideal—Macdonough's line was not much

[14] Macomb's report.

more than a mile[15] away from Macomb's batteries. If Prevost should rush these guns, which he believed to be "heavy ordnance,"[16] and which were capable of crippling the American vessels, he could, by merely turning them against Macdonough, force him to abandon his position. The British general's failure to do this, or even to attempt it, was "a grave error of judgment and of conduct,"[17] to which the Americans partly owe their victory. The indictment of Prevost, as drawn up in the second of four charges preferred against him by Sir James Lucas Yeo, is somewhat exaggerated: "Charge 2. For not having stormed the American works on shore, at nearly the same time that the said naval action commenced, as he had given Captain Downie reason to expect."[18] This does not agree with Macomb's report: ". . . . the flotilla appeared in sight round Cumberland Head. . . . . At the same instant the batteries were opened upon us, and continued throwing bomb-shells, shrapnels, balls and Congreve rockets until sunset, when the bombardment ceased. . . . . Three efforts were made by the enemy to pass the river at the commencement of the cannonade and bombardment, with a view of assaulting the works. . . . . One attempt to cross was made at the village bridge, another at the upper bridge, and a third at a ford about three miles from the works."[19] The sentence of court martial on Captain Pring and other surviving officers held on the *Gladiator,* at Portsmouth, corrects Yeo's charges by stating that "the promised co-operation of the land forces" was not "*carried into effect.*"[20] Why Prevost, with over 11,000 men,[21] in possession of the north bank of a fordable stream like the Saranac on the 6th, could not sweep aside Macomb's force, less than one-fourth of his in number (and about one-eighth in regulars), but sat still and waited four days, must ever remain a mystery, since Prevost's superiority was overwhelming not only in numbers but in quality.

[15] Mahan, p. 368. "The 24- and 32-pounder gun of that day ranged a sea mile and a half, with an elevation of less than fifteen degrees." "For information as to ranges, the author applied to Professor Philip R. Alger, U. S. Navy."

[16] Prevost's report, Sept. 11.

[17] Mahan, Sea Power in Its Relations to the War of 1812, p. 367.

[18] James's Naval Occurrences, 1817, p. 425.

[19] Letter to the Secretary of War, Sept. 15.

[20] James, appendix, p. clxviii, No. 94.

[21] Macomb's reports give the number as 14,000.

The one flaw in Macdonough's defense thus disposed of by the enemy's incompetence ashore, his carefully chosen position remains to be considered with regard to Downie's attack. The narrowness of the lake; its current setting northward toward the outlet; the length, light draught, and flat bottoms of the British vessels; the consequent impossibility of beating up against a southerly wind; these were the first premises. Compelled to run up with a northerly wind—which, when at all north, draws almost straight up the lake—Downie would find this wind light and baffling under the lee of Cumberland Head and in the bay. His lack of time, and the sudden and severe gales prevalent at that season, prevented him from waiting off the entrance for a southerly wind. If, as actually happened, the wind should be north-northeast, Downie would be able, with a working breeze inside, to set his course fairly well to the northwest—about as far up as the shoals west of the Head would allow. Macdonough therefore placed the head of his line so far north that it could not be turned, as Brieux's flank was at the Nile, yet his leading vessel, the *Eagle*, was not so near the northern shore as to be within range of field batteries, the heaviest pieces at Prevost's disposal. As a further precaution, to prevent if possible a raking fire against the *Eagle*, three galleys or gunboats were stationed forty yards inshore of her bow. Next in line was the *Saratoga*, making the van stronger than the rear, because if either were hard pressed or exclusively attacked the rear might be relieved from to windward, whereas the van could not be relieved from to leeward. With such a rescuing contingency in view, the *Eagle* mast-headed her topsail yards. Astern of the *Saratoga* was the *Ticonderoga*, then the *Preble*. Each of the intervals between the ships was guarded by two or three galleys in the rear.

The position of the entire line, in relation to Cumberland Head, Macomb's batteries (if captured), and the northern shore and shoal, was thought out with the utmost care, but in order to protect the rear from being flanked, the *Preble* must be anchored near the shoal off Crab Island. Since Macdonough's broadsides must face the entrance channel, his line could not deviate very much from a north-and-south position. He was therefore dependent upon the location of the Crab Island shoal; if this prevented him from anchoring his ships entirely out of range of the shore batteries at Plattsburgh, it allowed him to get within carronade range

of any possible attack. He brought the British still further within range by canting his line slightly eastward.

Every device known to seamanship for controlling the direction of broadsides and winding ship when at anchor was thoroughly prepared. While the British, coming to anchor under fire, could provide themselves simply with springs on their cables, Macdonough had not only springs, and an anchor hung over the stern, but a kedge planted broad off each bow, with a hawser and preventer hawser from each quarter to the kedge of that side.

The space between Macdonough's vessels was said, by Henley, to be 100 yards. It was enough, evidently, to require the use of all ten of the galleys in the secondary line of defense, and this would account for the fact that he did not form several of them in an L to the eastward of the *Eagle,* where their fire would have been more effective during the British approach and infinitely more serviceable during the battle, by flanking and raking the British line, yet remaining comparatively free from a return fire. Galleys so stationed would have seriously engaged the *Linnet's* attenton, six of the ten having an armament of two guns, a long 24 and an 18-pound columbiad. It was the lack of sufficient galleys to protect the flank of the rear that induced Macdonough to mount on Crab Island the only gun he could spare, a six-pounder.

Last, but not least, he had the obvious advantage of ships at anchor—the release of the crews from working sails to manning the guns. As he was short of full complements, and had been obliged to call upon Macomb to fill not a few gaps in his personnel, he needed the services of every man as a gunner free from a sailor's tasks.

If the preparation and conduct of the defense were thus beyond criticism, the attack seems to have been in the main faultless, both in conception and execution. Macdonough's dispositions being perfectly under observation, had been communicated to Downie, who made his plans accordingly. The *Confiance* was to head as far north as possible, in advance of her consorts, to turn, pass along the *Eagle* from north to south, give her a broadside, and then anchor head and stern across the bows of the *Saratoga.* If possible, Downie was to lay the *Confiance* athwart-hawse of the *Saratoga* and carry her by boarding. In such an attempt, he would be favored by the higher decks of his frigate and her much larger crew—over 300 to the *Saratoga's* 210. The *Confiance's* carronades

were mounted without ports purposely to belch canister upon the American decks. The smooth water of the bay was favorable to this design, but it was also favorable to American gunnery, and if the enemy's fire proved too severe, Downie was to anchor at such a distance that Macdonough's over-proportion of carronades would be least effective. The *Linnet* and the *Chubb* were to concentrate their attention on the *Eagle*, opposing their 27 guns, 17 long and 10 short, to her 20, 8 long and 12 short.[22] Three British vessels,

[22] Roosevelt's estimate of the comparative weights of metal from long and short guns in the total broadsides of the British squadron ("660 from long and 532 from short pieces") needs a slight correction, according to the statistics given under oath in the British court martial proceedings, which Mahan considers the most complete and satisfactory evidence concerning the battle. A manuscript copy of the trial, on file in the Naval War Records Library, Navy Department, contains the following:

"Account of the number and size of guns mounted on board His Majesty's Ship *Confiance*, George Downie, Esq., Sept. 11, 1814, viz.:

On the main deck.....	24 prs. long guns.....	26 in number.
	32 prs. carronades.....	4 in number.
On the round house....	24 prs. carronades.....	4 in number.
On the forecastle.....	24 prs. long guns.....	1 in number.
	24 prs. carronades.....	2 in number.
Total		37 in number."

Roosevelt gives the *Confiance* 37 guns, but of these he says that "she carried on her main deck 30 long 24's, 15 in each broadside; on her poop, which came forward to the mizzen-mast, were 2 32-pound (possibly 42-pound) carronades, and on her spacious top-gallant forecastle were 4 32- (or 42-) pound carronades, and a long 24 on a pivot." He thus gives her 31 long 24's, whereas both the British court martial and Macdonough's official report give her 27, the difference of 4 making Roosevelt's estimate that the British squadron fired a total broadside of 660 pounds from long guns, a figure which should be reduced to 612, provided the rest of his reckoning is correct. The estimate 612 allows for the fact that the pivot on the *Confiance* gave her a broadside of 14 long 24's. Macdonough's statement is as follows: "27 long 24-pounders, 4 32-pound carronades, 6 24-pound carronades, 2 long 18's on berth deck. Guns, 39." This agrees with the British records except for the last item, for which Cooper, the authority Roosevelt quotes, accounts as follows: "The *Confiance* . . . . had the gun-deck of a heavy frigate, mounting . . . . 30 long 24's." He then adds, "a long 24 on a circle" on her forecastle, with "4 heavy carronades," and "2 heavy carronades" on the poop. In a foot-note he says: "There were 39 guns on board the *Confiance*, but two of them were not mounted, or intended to be mounted. Captain M'Donough's report was probably made on the representation of some

including the largest, would thus grapple the two strongest of the enemy, and the comparative forces of the vans would be as follows: British van, 64 guns, 44 of them long; American van, 46 guns, 16 of them long. The *Finch* and the twelve galleys were to attack the little sloop *Preble,* and having disposed of her, were to rake the *Ticonderoga.* They were to make every effort to capture the *Preble* and turn her guns on the *Ticonderoga,* their object being to outflank the American van through the process of gradually eliminating the American rear.

Both squadrons were handicapped by a state of incomplete preparation, but this affected both with about the same degree of disadvantage. There had not been time on either side to train the men thoroughly at the guns, especially on the *Confiance* but also on the *Saratoga* and the *Eagle.* Some of the locks on the British flagship were found to be useless. On the other hand, the *Ticonderoga's* guns had to be fired by flashing pistols at the vents. The *Eagle* was so short of men to work the guns that even after borrowing 40 men from the *Saratoga,* she did not have enough. A few days before the battle her first lieutenant, Joseph Smith, received Macomb's permission to take 38 prisoners from the army guardhouse. They were glad to have their shackles removed and take part in the fight. Just before the battle, six musicians from the army band came aboard the *Eagle,* and were used as powder-boys. "The wife of one of the musicians" came with them. "During the engagement" she "took the place of a powder-man who had been killed and carried cartridges in her arms to the guns. To do this she had to step over the bodies of some of the dead, and among them she recognized her husband." [22]

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one who had not properly examined the English ship. That given here is taken from an officer who was on board the *Confiance* within ten minutes after the *Linnet* struck, and who was in charge of her for two months." The British court martial record, thus corroborated in part, had best be taken as better evidence than Cooper's story from an officer whose name is not mentioned. Mahan, Rodney Macdonough, and James agree with the British official account.

[22] Story related to Rear Admiral A. S. Barker, U. S. N., retired, by Rear Admiral Joseph Smith in May, 1875, and published in the February, 1914, issue of "The Navy." Admiral Smith served as first lieutenant of the *Eagle.*

THE BATTLE

Shortly after sunrise on September 11 the American guard-boat pulled in and announced the approach of the enemy. There was a good working breeze at the northward and eastward.

Eight bells were striking in the American squadron as the upper sails of Downie's vessels came in sight over Cumberland Head. They were hugging the shore so as to double the point sharply. Preceded by a store-sloop, and followed by the twelve galleys under latine sails, their line, in column, was as follows: *Finch, Confiance, Linnet, Chubb.*

After rounding the Head and hauling up to the wind simultaneously, they were in position, in line abreast, to reach the several places assigned. While the windward three lay to, waiting for the galleys to pull up and form to leeward, the *Finch* ran off half way to Crab Island, then tacked, and joined the gunboats as the others filled. The reason for this maneuver is not known. Her commander, Hicks, failed to keep close enough to the wind during the approach, and could not reach his assigned position between the *Ticonderoga* and the *Preble.*

Downie had now noticed to his dismay that no co-operation by Prevost's army was visible, but he was committed to his movement by this time, and he persisted. As the first blow was to be struck by the flagship, she sailed ahead of her consorts and set her course for the *Eagle.*

Henley, in command of the *Eagle,* was impatient to test the range. Suddenly the tension of waiting was broken as he discharged in quick succession his four long 18's in broadside. The shot fell short, and he ceased firing.

Soon afterward, according to a story told to Lossing by Commodore Samuel Livingston Breese, who was commander of the gunboat *Netley* in the action, and James Sloan, Macdonough's clerk, "the *Linnet,* as she was passing to attack the *Eagle,* gave the *Saratoga* a broadside, but without serious effect. One of her shots demolished a hencoop on the *Saratoga,* in which was a young game-cock which some of the seamen had lately brought on board. The released fowl, startled by the noise of cannon, flew upon a gun-slide, and, clapping his wings, crowed lustily and defiantly. . . . . the incident appearing to" the sailors as "ominous of victory." "At this animating sound," says

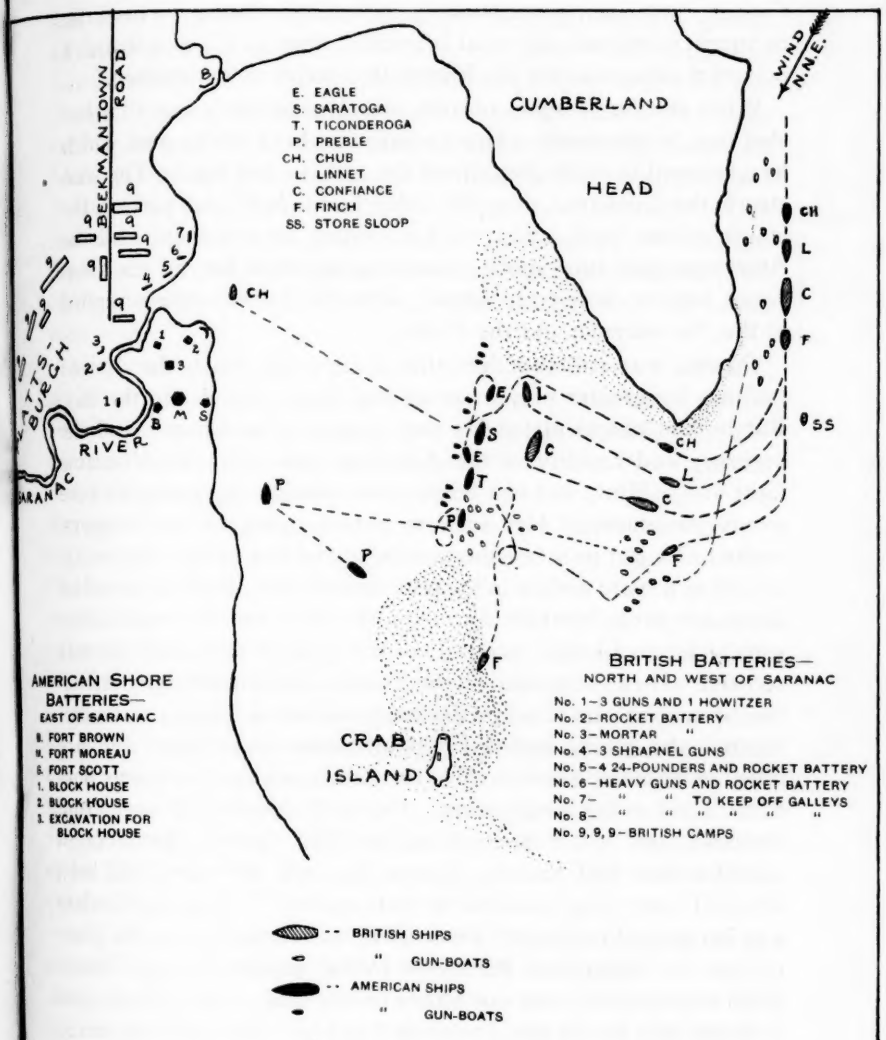

Diagram based on a sketch prepared by Major de Russy, U. S. A., accompanying General Izard's official report dated September 18, 1814, and a pencil sketch by Commodore Macdonough, together with official reports of American and British naval officers. For clearness, the ships are drawn out of scale. The bow of the *Eagle* and the stern of the *Preble* indicate their respective positions. The point of Cumberland Head is about two miles from Fort Scott.

Cooper, "the men spontaneously gave three cheers. This little occurrence relieved the usual breathing time . . . . and it had a powerful influence over the known tendencies of the seamen."

When the *Eagle* again opened, and Macdonough saw that her shot told, he personally sighted a long 24—his favorite gun, which he continued to sight throughout the action—and fired. The shot struck the *Confiance* near the outer hawse-hole and ranged the length of her deck, killing and wounding several men. All the American guns now spoke, concentrating their fire on the *Confiance,* but she came on in silence, while the British galleys replied to the *Ticonderoga* and the *Preble.*

Downie was still confident that if he could reach the desired position his greater proportion of long guns would win the day. But he had miscalculated his own powers of endurance and the accuracy and rapidity of the American fire. The wind became light and baffling, and the frigate was already beginning to take severe punishment. Her anchors were hanging by the stoppers, ready to let go; in a few moments the port bower was cut away, as well as a spare anchor in the port fore-chains. Forced to anchor about 400 yards from the *Saratoga,* she came into the wind handsomely, let go a kedge, and did not fire a single shot until she was secured. Then she opened on the *Saratoga* with a terribly destructive broadside. By this first discharge of her 14 long 24's, double-shotted, the quoins lashed for point-blank range, the *Confiance* killed or wounded about forty of the *Saratoga's* men, or nearly one-fifth of her entire complement. Her hull shivered all over from the shock, and "after the crash had subsided, Captain Macdonough saw that near half his crew was on the deck, for many had been knocked down who sustained no real injuries." [24] Among the slain was her second lieutenant, Peter Gamble, who had taken the place of her first lieutenant, Raymond Perry, absent through illness. With Gamble's loss, but one officer of his rank, Acting Lieutenant Vallette, was left in the American flagship. The crew recovered from their first test of fire immediately, and served the guns with speed and precision.

Had the fire of the *Confiance* maintained the deadly precision of her first broadside, she might have forced the *Saratoga* to surrender by decimating her crew. As it happened, however, the British were too confident of the efficacy of their prearranged device to

[24] Cooper, p. 349.

keep their guns at the proper elevation; the quoin-lashings gradually stretched, and as the quoins loosened, the fire became less and less destructive, the shot passing higher at each successive discharge. Nearly all the hammocks in the *Saratoga's* netting were cut to pieces at the second broadside, and as the battle advanced, her standing rigging was cut farther and farther from the deck. Had Downie lived, he might have corrected this, but within fifteen minutes after the action began, one of the *Saratoga's* shot struck the muzzle of a twenty-four on board the *Confiance,* sent the piece bodily inboard, and killed him. Lieutenant Robertson then took command.

Meanwhile, the *Linnet,* standing in farther to windward, anchored nearer than the *Confiance,* in a very favorable position forward of the *Eagle's* beam. The *Chubb* kept under way, her commander, McGhie, intending, if possible, to rake the American line, by anchoring between the *Eagle* and the *Saratoga,* under the former's stern. When Henley saw what the *Chubb* was attempting,[25] he sprung his whole broadside upon her. The *Linnet* and the *Chubb* were together superior to the *Eagle,* but Henley's quick work, concentrated on the *Chubb,* with the aid of the nearby galleys which guarded the interval put her out of commission. McGhie was prostrated by a not very severe wound; the sloop's "cables, bowsprit, and mainboom shot away,"[26] she drifted down the American line. As she neared the *Saratoga,* Macdonough gave her a single shot from a bow gun; she lowered her colors, and Midshipman Platt of the flagship took possession of her and anchored her inshore. McGhie was reprimanded by the sentence of his court martial for not anchoring "so as to do the most effectual service."

In the rear, the *Finch* had failed to reach her assigned position and was edging down on the *Preble's* starboard quarter[27] near the shoal, to rake. Most of the British galleys were closing up to her support, and dealing with the one-gun American galleys inshore of the *Ticonderoga's* stern. Budd found that since the wind had shifted several points more to the eastward, his spring was too short, and he was obliged to let it go entirely, and keep his broadside to bear with two sweeps out of his stern ports.[27] Disturbed

[25] Henley's report to the Secretary of the Navy, Sept. 16.
[26] Pring's report to Sir James Lucas Yeo, Sept. 12.
[27] Budd's report to Macdonough, Sept. 13.

by the *Preble's* fire, the *Finch* tried to go about, but failed, and was raked. By this time, the American galleys had drawn back, leaving the *Preble* unsupported, and four British galleys, each armed with one long 24 and a 32-pound carronade, were rapidly pulling up close to the *Preble's* weather bow, in such a position that her broadside would not bear on them. Budd saw that "in five minutes they would have been alongside," [27] and boarding his small sloop. The alternative, to escape or be captured, was, to say the least, embarrassing. The *Finch* had recommenced her fire; the approaching galleys were pouring in grape and canister. Opposed to the *Preble's* broadside of three nine-pounders and her bow gun of the same caliber were, on the *Finch* and the four galleys, fourteen guns then bearing, at one time or another. The crew of the *Preble* numbered but 30 men; the crews of the British galleys averaged 43 to each, (if we take the mean of James's estimate, 35, and Hiram Paulding's statement, 50,) and four times this number was too much for Budd's crew to handle. To retreat would subject him to the damaging imputations that were not wanting after the battle; to be captured—and he had no means for spiking his guns—meant that the enemy would turn the *Preble's* broadsides on the *Ticonderoga*. He thought best, with the concurrence of all his officers,[27] to get under way, and as he was too far to leeward to give assistance to the rest of the squadron, he cut his cable, wore round toward the *Finch*, which then stood off, and after giving the galleys a broadside of grape, he managed to distance them, and sailed inshore. This action was approved by Macdonough, who said: "Lt. Budd acted with propriety in getting under way with the *Preble*. He would otherwise have been boarded by the enemy's galleys." [28] All the British galleys then swept up under the *Ticonderoga's* stern, followed by the *Finch* under her sweeps.

Led by the *Murray*, under Lieutenant James Robertson, and the *Beresford*, Lieutenant Bell, the gunboats swept up gallantly, again and again, within grappling distance of the *Ticonderoga*, and were as often repulsed. Lieutenant Cassin coolly walked the schooner's taffrail in the storm of musketry and grape, watching the enemy's movements and directing the loading of his guns with canister and bags of musket balls whenever they attempted to close and board. Only the stern guns, as a rule, could be used.

[27] Budd's report to Macdonough, Sept. 13.
[28] Rodney Macdonough, p. 191.

"To carry her by a fire poured into her stern, or to board her over the taffrail, were both most perseveringly attempted, and as gallantly, heroically, persistently, and successfully resisted. For this, next to Commodore Macdonough himself, Captain Cassin deserves to be remembered by the navy, and by the frontier which he fought to defend, so long as history shall endure. It was one of *the* great feats of the war, standing out prominently and challenging admiration. But for it, Commodore Macdonough, with all his genius and forecast, all his skill, gallantry, and perseverance, would have failed to conquer." [29] Among the schooner's officers was Midshipman Hiram Paulding. He was but sixteen years old, but owing to the shortage of officers, he was placed in command of a division of eight guns. When it was discovered that many of the matches for firing the guns were useless, young Paulding drew his pistol and flashed it at the powder in the vent-grooves, firing the guns of his section in this way during the whole engagement.

After the *Preble* had left the fight, the *Finch,* under sweeps, managed to close with the *Ticonderoga.* A short, hot conflict ensued in which the *Finch,* "about the middle of the engagement," [30] her sails and rigging cut up, and her hull shattered, became unmanageable and drifted aground on the shoals near Crab Island. She was fired on by the six-pounder there stationed, which was manned by the invalids from the naval hospital on the island, and when the *Preble* bore up to attack her, she surrendered.

While Cassin was doing this vitally important work of sustaining the rear, the van seemed to be approaching disaster. The *Linnet,* paying no attention to the American gunboats, which were making themselves very troublesome, directed her whole fire against the *Eagle,* aided by part of the fire of the *Confiance.* Finally the *Eagle's* springs were shot away, "many of her starboard guns" were "disabled," [31] and she swung into the wind, hanging in such a position, Henley reported, that it was out of his power to bring a single gun to bear upon either the *Linnet* or the *Confiance.*

At 10.30 Henley cut his cable, sheeted home his topsails, ran down behind the *Saratoga,* and anchored by the stern between and a little inshore of the flagship and the *Ticonderoga.* From this position he opened on the *Confiance* with his port guns without

[29] James H. Ward. Naval Tactics, p. 118.
[30] Pring's report to Yeo.
[31] Henley's report to the Secretary.

being exposed to the fire of the frigate or the brig. Evidence is not lacking that Macdonough thought Henley should have found means to maintain his most important position, but he wrote the following guarded comment in his report: "The *Eagle*, not being able to bring her guns to bear, cut her cable and anchored in a more eligible position . . . . unfortunately leaving me exposed to a galling fire from the enemy's brig."

The *Saratoga* was now in a most critical situation, for the *Linnet*, after driving off the American galleys, which at that end of the line were very well fought, sprung her broadside to rake the bows of the American flagship.

The *Saratoga*, with a broadside of 13 guns, was now under a focal fire from two vessels which had begun the action with a total broadside of 27 guns. Moreover, the British preponderance in long guns was now felt most sharply, Robertson and Pring having 22 long guns to Macdonough's 4 on the *Saratoga*. The raking position of the *Linnet* more than balanced the aid Macdonough received from the *Eagle*, which could reach only the *Confiance*. Had Downie lived, he must have thought that his plans were turning out very well.

Macdonough had been working like a sailor at his favorite twenty-four. While he was training it, a shot cut the spanker-boom in two, and a large part of the heavy spar knocked him senseless with a blow that might easily have been fatal. A cry arose that the Commodore had been killed, but he roused himself and rejoined his gun-crew. A few minutes after this accident the cry arose again that he had been slain; another shot had taken off the head of the gun-captain and driven it against him with such terrific force that he was thrown entirely across the deck and lay motionless in the port scuppers, covered with blood. This time he found great difficulty in resuming his labors. "The *Saratoga* was twice set on fire by hot shot from the enemy's ship," wrote Macdonough, with his own hand, in the report of September 13. Cooper states that "the Americans found a furnace on board the *Confiance* with eight or ten heated shot in it." The use of hot shot was entirely legitimate, but at the British court martial several officers testified that none of the English vessels fired hot shot or had furnaces. They said the hot shot came from "the American batteries on shore." There is apparently no further evidence bearing on this absurd inconsistency.

On both sides there had been great havoc among both guns and men, and the fire of the flagships had slackened very materially. One by one the *Saratoga's* starboard guns became disabled, either by shot or overcharging. Finally the only gun left, a carronade, on being fired, broke the navelbolt, flew off the carriage, and actually fell down the main hatch. On the *Confiance's* engaged side but four guns were serviceable. The *Linnet's* broadsides were becoming unbearable.

But Macdonough's foresight had provided the means for bringing the *Saratoga's* first broadside to bear, and snatching victory from defeat. Like John Paul Jones, he had "not yet begun to fight."

The order was given to wind ship. Her bow pointing northward, and the wind not veering much from the north-northeast, she was to be turned end for end, her bow swinging westward and then south. At such a crisis, the maneuver was far from an easy one. The stern anchor was let go, its cable slacked, and strain taken on the line leading from the starboard quarter to the kedge planted off the starboard bow. The riding bow cable was paid off, permitting the bow to swing freely to port, westward, under the influence of the wind and the strain on the starboard quarter line. The stern was thus hauled to the northeastward, and exposed to the *Linnet's* raking fire.

Thereupon the hawser leading from the port quarter to the inshore kedge—planted originally off the port bow—was shifted forward, dipped round the bow, and led aft to the starboard quarter. By heaving on this line, the stern was sprung farther westward until the aftermost port gun bore. This gun was immediately fired, then the next, and a moment later the entire fresh broadside opened with fatal effect. It was the decisive moment of the action, and of Macdonough's life.

The *Confiance,* her fire now limited to four guns, had perforce attempted to follow the *Saratoga's* example, but without success. She had had shot away, one after another, the anchors and ropes upon which she depended for such a maneuver. An effort was made to swing her by a new spring on the bow cable, but she got only so far round, in this slow process, as to expose her bow, nearly at right angles, to the raking fire of the *Saratoga* and the *Eagle,* and hung in that position. "The ship's company," reported Lieu-

tenant Robertson, then "declared they would stand no longer to their quarters, nor could the officers with their utmost exertions rally them." The men were being cut down by a merciless fire; the frigate was in a sinking condition, kept afloat by running her guns to the starboard side so as to bring the shot-holes out of water. On the lower deck, the wounded had to be continually moved, to prevent their being drowned where they lay. She had lost in killed and wounded over half her crew of 300; her masts had been splintered until, as Midshipman Lea wrote, they looked, with the spars, "like so many bunches of matches," and the sails "like a bundle of old rags." The young prisoner concluded his letter to his brother by saying "There is one of our marines who was in the Trafalgar action with Lord Nelson, who says it was a mere flea-bite in comparison with this." About 11 o'clock the *Confiance* struck her colors.

Macdonough then hauled on his starboard quarter-line, slacking the port-quarter-line, and turned his broadside on the *Linnet*.

After the swarm of galleys under the *Ticonderoga's* stern had made a last desperate assault, several of them getting almost within a boathook's length of her taffrail, they were forced to draw off, so crippled by the slaughter they had suffered from Cassin's guns that they could hardly man the oars. They made their way slowly out of range.

Pring won lasting fame by fighting the *Linnet* for fifteen minutes after the *Confiance* surrendered. "The shattered and disabled state of the masts, sails, rigging and yards," he reported, "precluded the most distant hope of being able to effect an escape by cutting the cable. The result of doing so must in a few minutes have been her drifting along side the enemy's vessels, close under our lee; but in the hope the flotilla of gunboats, who had abandoned the object assigned them, would perceive our wants and come to our assistance, which would afford a reasonable prospect of being towed clear, I determined to resist . . . . and . . . . despatched Lt. H. Drew to ascertain the state of the *Confiance*." When Drew returned with the news of Downie's death, Pring surrendered "his Majesty's brig . . . . to prevent a useless waste of valuable lives." He richly deserves to be remembered, with Macdonough and Cassin as one of the notable heroes of the battle.

The British galleys had been drifting away to leeward, and now that all the larger vessels had hauled down their colors, they

moved slowly off, pulling but a very few sweeps, and escaped. Macdonough signalled his galleys to give chase, but finding soon afterward that their men were needed at the pumps of several ships, he revoked the order.

The action had lasted two hours and twenty minutes. On both sides the damage to hulls and rigging was unusually severe. Not a mast in either squadron would bear making sail. The *Saratoga* had 55 shot-holes in her hull; the *Confiance* 105, many of them between wind and water. The Americans had a total of 52 killed and 58 wounded, the latter figure indicating only hospital cases. In all, 194 killed and wounded were taken out of the British ships; besides the known dead, 84, many bodies had been thrown overboard, and there must have been considerable loss in the galleys.

"At dusk," Macomb reported, "the enemy withdrew his artillery from the batteries and raised the siege; and at 9, under cover of the night, sent off in a great hurry all the baggage he could find transport for, and also his artillery. At 2 the next morning the whole army precipitately retreated, leaving the sick and wounded." After the loss of Downie's squadron, Prevost had no other course but retreat, as the Duke of Wellington agreed.

"The battle of Lake Champlain," in the words of Mahan, "more nearly than any other incident of the War of 1812 merits the epithet 'decisive'". James H. Ward, in his Manual of Naval Tactics, analyzes Macdonough's defense as an ideal example in the chapter devoted to Fighting Fleets at Anchor, comparing it with Sir Samuel Hood's relief of St. Christopher's in 1782 and the Battle of the Nile. He states, in conclusion, "that the careful student will find in history no general action fought at anchor more instructive, therefore more worthy of his attentive notice, close study indeed, than this, viewed in whatever aspect—whether in reference to the attack or the defence, the personnel or the material, skill or science, gunnery or seamanship, or as furnishing examples, in most of these respects, of warning as well as for imitation."

Of Macdonough, who was thirty years old at the time of the battle (and who is generally considered to have been twenty-eight, owing, possibly, to an erroneous statement to that effect in Niles's Register), Roosevelt speaks in the highest terms: "Macdonough in this battle won a higher fame than any other commander of the war, British or American. He had a decidedly superior force to

contend against . . . . and it was solely owing to his foresight and resource that we won the victory. . . . . His skill, seamanship, quick eye, readiness of resource, and indomitable pluck are beyond all praise. Down to the time of the Civil War he is the greatest figure in our naval history. A thoroughly religious man, he was as generous and humane as he was skilful and brave; one of the greatest of our sea-captains, he has left a stainless name behind him."

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

EMERGENCY REPAIRS TO U. S. S. *WALKE*

By Lieut. Commander F. T. Evans, U. S. Navy

Two detachments of the reserve torpedo flotilla, U. S. Atlantic fleet, sailed from New Orleans, La., for Garden Key, in the Dry Tortugas Islands, in the early morning of March 14, 1914, and arrived at their destination on the afternoon of the following day. The vessels in these detachments were parts of the first and second divisions of the reserve torpedo flotilla, and contained the following vessels: First Division, *Flusser* (flagboat), *Preston, Reid;* Second Division, *Monaghan* (flagboat), *Walke, Sterett, Terry.*

The passage was made in good shape and the vessels arrived at Garden Key apparently in good condition, taking berths by divisions; the second division at the North Dock; the first division at the South Dock.

Some hours after anchoring it was discovered on board the *Walke* that the after trimming tank, known as D-8, was carrying a heavy pressure of air. This was first noticed by the leakage of air around some rivets in the deck of that compartment. An examination of this tank which, with D-7, had been full of water for washing purposes, when leaving New Orleans, showed it to be partially filled with salt water, and that water was entering D-8 through the sluice from D-7. On attempting to open the manhole to D-7 it was found that D-7 was carrying a head of water. A suction was put on D-8, the sluice valve closed to D-7, and D-8 pumped out. This compartment showed itself to be tight. The sluice valve to D-7 was then opened and it was attempted to reduce the water head on this compartment, but without success, thus showing a serious underwater damage to D-7.

It then being too late in the day to send over a diver, D-7 and D-8 were secured, decks and manholes shored up, and the water-

tight door leading to the after store-room, into which compartments D-7 and D-8 open, was carefully dogged.

There was no evidence available that the ship had struck any object or the bottom and it was supposed that the forward starboard propeller strut, due to continued, though slight, vibration had pulled itself loose from the plating of D-7, to which compartment the forward struts are riveted.

On the morning of the 16th, the next day, a diver was sent down and he reported a jagged hole in the bottom, reporting that the hole was about a foot and a half long by about a foot wide, situated abaft the forward strut and between the legs thereof, and that the palms and riveting of the struts were solid.

When this condition was revealed it was decided to cover the hole, pump out D-7, drill the hull around the hole and bolt on a patch. In order to pump out D-7, an attempt was made to place a collision mat over the hole, but this failed, because the hole was situated so close to the struts that a good placement of the collision mat was not possible, even though the mat was set "diamond" fashion.

It was then decided to close the hole temporarily by using a padded wooden patch, bolt, and buckler bar. Accordingly, a wooden patch was made, twenty-four by thirty-three inches, of double-crossed inch boards; this was padded on its bearing surface with several thicknesses of fear-naught, which in turn was covered with two thicknesses of number eight duck. The duck was tacked to the edges of the wooden patch. A bolt hole was bored through the whole, one inch in diameter and in the fore and aft center of the patch, but, due to contour of the hole in the bottom, was placed ten inches from the top of the patch. A piece of scrap iron from the wreck of the coaling plant, eighteen by three by one inches, was used for the buckler bar, through which was screwed an inch brass bolt, twelve inches long. Lock nuts were put on the bolt on the non-bearing side of the buckler bar to prevent the bolt turning. (See Fig. 1.)

While the wooden patch, buckler bar and bolt were being prepared, ammunition and other weights in the ship were shifted forward; the fore paint locker, quartermaster's store room and lamp room were broken out and filled with salt water. This resulted in lifting the stern some three feet, thus raising the deck over D-7

and D-8 about one foot above the water line. D-7 was then opened and the hole could be plainly seen from the manhole.

In the meantime, a diving platform was constructed by decking over two whaleboats which were secured catamaran fashion with three four-by-four inch white pine timbers. The decking was seven-eighths inch white pine. This material was carried in the

FIG. 1.—WOODEN PATCH READY TO GO DOWN

flotilla for a diving platform for use if required during torpedo practice. The four-by-fours were too light and broke during the first day's use. This was before the pump and chests had been placed on the float. Repairs were effected by replacing the four-by-fours with twelve-by-threes of yellow pine from the wreck of the coaling plant. (See Fig. 2.)

On the morning of the 17th the diver went down and placed the buckler bar. The wooden patch was then sent down to him, being handled by hogging and hauling lines. The diver soon had the patch in place and bolted tight with the buckler bolt.

As soon as the wooden patch was in place the compartment was pumped out and the patch, except for slight seepage around the buckler bolt, was found tight.

Drilling was commenced immediately. Thirty-five half-inch holes were drilled around the puncture with a pitch of about two inches. Ten of those holes were tapped and bolts three inches long

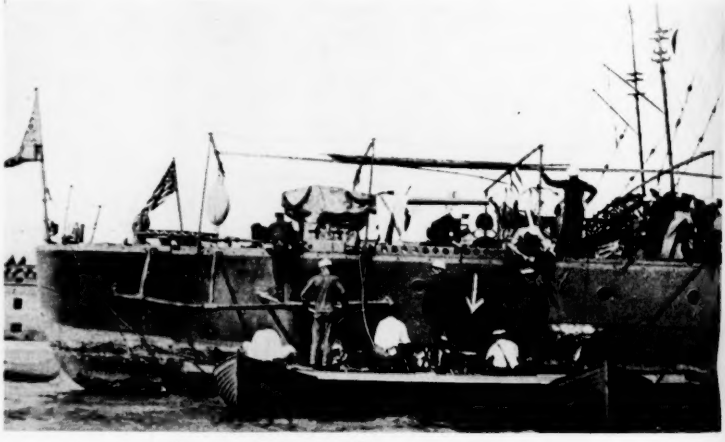

FIG. 2.—GENERAL VIEW FROM STARBOARD

were screwed through the bottom, three on top, three on the bottom and two on each end. The modus operandi was to drill through until the wooden patch was well cut, then withdraw the drill and plug the hole with a soft wood plug. Due to the buckler bar, some of the holes could not be drilled.

While the drilling was progressing, a quarter-inch mild-steel plate was cut from one of the coal pockets at the wreck of the coaling plant. This was made twenty-four by thirty-three inches.

When the drilling was finished and the stud-bolts were in place D-7 was flooded and the diver removed the wooden patch, buckler bar and drove out the wooden plugs. The fear-naught and canvas were cut from the patch, exposing the drill holes in the wood, from which a template for drilling the steel patch was made.

The stud bolt centers were then center-punched on the steel plate and the steel plate was drilled to receive the ten stud bolts; the holes were drilled three-quarters of an inch in diameter, thus leaving a quarter of an inch leeway to fit the plate over the stud bolts.

When the plate had been drilled it was red-leaded and a gasket made of eight thicknesses of Raven's duck, heavily red-leaded,

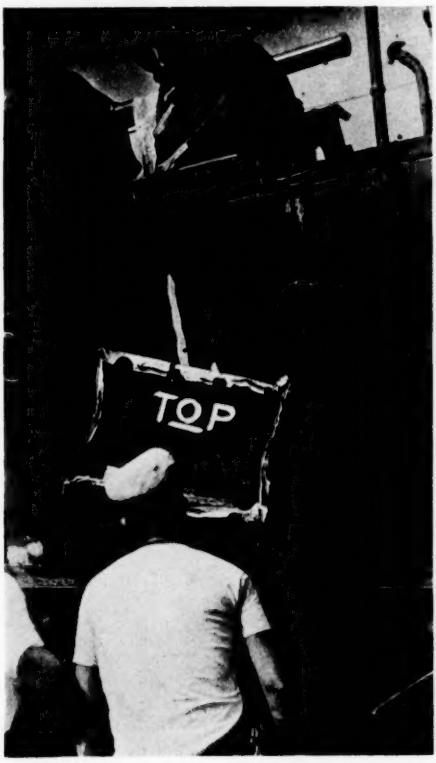

FIG. 3.—STEEL PATCH BEING LOWERED TO DIVER FOR PLACEMENT

was secured to its bearing surface. This plate was then lowered to the diver, who placed it over the hole and bolted up the nuts on the ten stud bolts. (See Fig. 3.)

After the studs were bolted up D-7 was pumped out and drilling began again. The drift holes which could not be drilled before on account of the buckler bar were put in and the remaining drift

holes were drilled on through the plate. As soon as each hole was drilled a wooden plug was driven in.

It became evident, as the work progressed, that it would be impossible to bolt up from the inside, because of the restricted space; consequently it was decided to stick the bolts from the inside, hold the bolts from the inside and have the diver bolt up, which pro-

FIG. 4.—INSIDE VIEW OF PATCH

cedure was followed. The bolts had washers and red-lead grommets under both heads and nuts, so that watertightness might be assured. The work of bolting up progressed rapidly—the diver would drive back a wooden plug and the men inside would insert a bolt, hold on and the diver would bolt up.

The time for actual repairs was about thirty-one hours, but further time was expended to allow the diver to burr the threads on all bolts and to trim up the edges of the gasket. Upon completion of bolting up, the patch showed absolutely no seepage and every bolt was tight.

Close examination of D-7 showed that the object which caused the damage penetrated some three feet, or at least far enough to buckle the amidship bulkhead, which showed clearly the point of impact.

Subsequent examination of a submerged and damaged steel shaft beacon in the West Channel to Garden Key led to the conclusion that in swinging the turn in the channel with left rudder, the Walke's stern swung into the beacon and thus sustained the damage, although no one on board felt any shock of impact.

This beacon, the fifth right-hand beacon in the West Channel, was pulled out into the channel in 1913 and was a dangerous unreported menace to navigation. It projected well out into the channel; was about six feet under water where the chart shows some thirty feet.

There are no points of particular interest in the foregoing and nothing was done beyond the scope of the resourcefulness of a seaman, but the facts are given as a guide to some unfortunate sea-faring brother, who may some day be placed in a like predicament.

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THE NECESSITY TO THE NAVAL SERVICE OF AN ADEQUATE MARINE CORPS

By Lieut. Colonel Eli K. Cole, U. S. M. C.

A naval or military service exists for the purpose of protecting the interests of the country concerned, and while its final worth will be measured by its performance in time of war, the greater part of its work is done in time of peace, and, on the theory that an ounce of prevention is worth a pound of cure, one of the great functions of a naval or military service is the preservation of peace.

This consideration affects particularly the naval service, in that in time of peace it is charged, in conjunction with the State Department, with the duty of protecting American interests in foreign countries.

The general policy of the United States in regard to the use of its naval forces in this connection seems to be covered by the following extracts from the Navy Regulations, 1913:

R. 1633. During a war between civilized nations with which the United States is at peace the commander-in-chief and all under his command shall observe the laws of neutrality and respect a lawful blockade, but at the same time make every possible effort that is consistent with the rules of international law to preserve and protect the lives and property of citizens of the United States wherever situated.

R. 1646. On occasions where injury to the United States or to citizens thereof is committed or threatened, in violation of the principles of international law or treaty rights, the commander-in-chief shall consult with the diplomatic representative or consul of the United States and take such steps as the gravity of the case demands, reporting immediately to the Secretary of the Navy all the facts. The responsibility for any action taken by a naval force, however, rests wholly upon the commanding officer thereof.

R. 1647. The use of force against a foreign and friendly state, or against anyone within the territories thereof, is illegal. The right of self-preservation, however, is a right which belongs to states as well as to individuals,

and in the case of states it includes the protection of the state, its honor, and its possessions, and the lives and property of its citizens against arbitrary violence, actual or impending, whereby the state or its citizens may suffer irreparable injury. The conditions calling for the application of the right of self-preservation cannot be defined beforehand, but must be left to the sound judgment of responsible officers, who are to perform their duties in this respect with all possible care and forbearance. In no case shall force be exercised in time of peace otherwise than as an application of the right of self-preservation as above defined. It must be used only as a last resort, and then only to the extent which is absolutely necessary to accomplish the end required. It can never be exercised with a view to inflicting punishment for acts already committed.

R. 1648. Whenever, in the application of the above-mentioned principles, it shall become necessary to land an armed force in foreign territory on occasions of political disturbance where the local authorities are unable to give adequate protection to life and property, the assent of such authorities, or of some one of them, shall first be obtained, if it can be done without prejudice to the interests involved.

Stockton, in his Manual of International Law, page 143, states:

With respect to . . . . weak states with unstable governments, it at times occurs that citizens abroad must be protected at once, not by diplomatic representation; there is no time for that, but by the employment of naval force.

Under these circumstances whenever civil disturbances occur, it is usual for naval powers to send a naval force to the place of the trouble or threatened commotion for the purpose of affording protection or asylum to the citizens that may be there domiciled. In those cases the regulations of the navy already quoted must be followed so far as they can apply. The responsibility for any action taken by a naval force rests wholly upon the commanding officer thereof, after due consultation with the diplomatic or consular officer upon the spot.

At times the mere appearance of a naval force, accompanied by a firm attitude on the part of the officer in command, will prevent the resort to active measures. A display of force is sometimes ordered by Congress or by the President of the United States.

It happens at times that the commanding officer of a naval force is required by circumstances or request to protect the citizens of other countries than his own. Instances of this kind have occurred of late years, for example, in the protection afforded by British men-of-war in Alaska at the time of a threatened Indian uprising, and by our own vessels on the Isthmus of Panama and at Bluefields in Nicaragua.

As to the third class of governments, such as are ordinarily classed as semi-civilized or barbarous, intervention by force in behalf of citizens domiciled or sojourning there is a more common matter. In these countries the employment of naval forces is the principal means of such protection, added thereto at times by the landing of military detachments.

With the Monroe Doctrine a vital principle in the foreign relations of the United States, under which we view with suspicion, if we do not consider it an unfriendly act, any hint of European aggression toward any American government, our country must assume a certain responsibility for the acts of such republics, and, denying the right to those aggrieved, we must take upon our own shoulders the duty of safeguarding the interests of European countries. With the completion of the Panama Canal and with the increased commerce and foreign intercourse with the countries involved our responsibilities will be increased.

In conjunction with the State Department in time of peace the Navy Department is of necessity intrusted with the duty of protecting American interests in foreign countries, and, as a consequence, ships of the navy must be stationed so as to enable a naval vessel to reach any point of threatened disturbance at short notice.

Ships of the Naval Service, be they battleships, gunboats or transports, are much less restricted in their movements in foreign waters than would be the case with army transports on a similar mission, and the presence of the former will be taken as a matter of course, while army transports, with troops on board, would be barred or their presence considered as an unfriendly act, and in any event, would tend to defeat the very purpose for which sent. The mere presence of a small naval force may serve to gain the object sought or to preserve the peace, but, on the other hand, conditions may be such that a decided increase in the naval force will be required with the added possibility of more or less extended landing operations (Nicaragua, 1912), (Oriente Province, Cuba, 1912).

Any such reinforcement should be provided by the Naval Service, if for no other reasons than (a) that officers of the Naval Service of command rank are usually versed in international law and in diplomatic usages; (b) that, being first on the spot, they become thoroughly familiar with the conditions to be met, and if superseded by other officers of the same service the continuity of action will be preserved; and (c) that bringing into the matter forces of another department will result in delay, divided responsibility and in lack of harmonious action, and at the same time will tend to make a peaceful settlement more difficult and at an increased expense to the government.

That the employment of the naval forces alone for duty of this sort is in accordance with our policy and custom is shown by the statement of Secretary Cass in 1857:

> Our naval officers have the right—it is their duty indeed—to employ the forces under their command not only in self-defense, but for the protection of our citizens when exposed to acts of lawless outrage, and this they have done, both in China and elsewhere, and will do again when necessary, but military expeditions in the Chinese country cannot be undertaken without the authority of the national legislature.

The use of marines as legation guards is based upon the same considerations; they are in foreign countries, the commander-in-chief of our naval forces in those waters is the one who would be called upon for relief in case of necessity, and being of the same service, the necessary unity of action is assured.

For these reasons it is believed that the wisest course for the Navy Department to adopt is one that will always permit that department to have at its disposal a force capable of initiating and carrying to a successful conclusion, short of war, in conjunction with the ships, any decision in regard to our foreign policy that the State and Navy Departments may consider essential for the United States to adopt.

By custom the Marine Corps has come to be considered, and, in view of its training with the navy, very properly so, as a body of troops available and suitable for immediate dispatch to those countries where conditions require a display of force, either as a caution or for the actual protection of American interests. Marines are part of the naval forces, and their employment in this manner (as an adjunct to the naval forces on the spot) is accomplished without the strained relations that would follow in case troops of the army were so employed, and at a much less expense than would be involved thereby.

Under normal conditions the distribution of the Marine Corps is about as follows:

(1) Sea service ..... 22 per cent.
(2) Foreign service ..... 11 per cent.
(3) [1] Navy yards, naval prisons, Marine Corps posts.. 25 per cent.
(4) Special duty, band, recruiting, clerical..... 5 per cent.
(5) Recruit depots ..... 10 per cent.

[1] Includes men sick in hospital, on furlough, in confinement, or about to be discharged.

This leaves a balance of about 2600 men (27 per cent), and from this number must be formed the advance base forces for each coast, and from these, reinforced by reducing the already too-small detachments at navy yards and by taking men from the recruit depots before their course of instruction is finished, must also be formed any expeditionary organization.

This number is all too small, particularly when it is considered that the desired efficiency of that part of an advance base force pertaining to the fixed defenses can be obtained only by constant drill and instruction with the material with which it is supplied.

Up to and including the present time all organizations assembled for advance base training have been included, by force of necessity, whenever the Marine Corps has been called upon to furnish an expeditionary force (seven times in a trifle over three years); while such service is of great value along certain lines, it cannot but interfere materially with its proper preparedness for war as part of the fleet. The reduction in the detachments at navy yards for expeditionary service always leaves the yards inadequately guarded, and in view of the time deemed necessary for training of recruits at naval training stations, the disadvantage of cutting off from one to eight weeks of the fifteen weeks course of instruction at Marine Corps recruit depots is apparent, yet under present conditions this must be done if the desired number of men is provided.

Actually and proportionately, the number of marines serving afloat is believed to be too small, the maximum number being about 2250 (22 per cent). As a comparison, in the British Navy about 11,500 marines (61 per cent) are understood to be serving afloat, and the scope of the duties of both officers and men is being increased constantly.

Service afloat on ships of the navy is absolutely essential for the efficiency of the Marine Corps as a branch of the Naval Service; if such service is discontinued or curtailed, the characteristics of the Marine Corps will change, and in a short time it will lose touch with naval conditions and the handiness under all conditions that can be gained by such service only, its mobility will be decreased, and eventually its existence as a naval adjunct will cease. Thereafter the navy will be compelled to rely in its landing operations on the complements of its ships, with all the attendant disadvantages and decrease in efficiency of the ships, or on strictly

military forces, not trained for service with the navy, with the great disadvantage of delay and divided responsibility.

As a matter for future consideration it is suggested that the most satisfactory arrangement for the defense of permanent naval bases would be to place the entire defense thereof in the hands of the Naval Service.

The foregoing considerations can be amplified, but it is believed they show that the naval service needs for its own benefit and for the efficient performance of its duty, ashore and afloat, in peace or in war, an adequate Marine Corps, and by this is meant one of such strength as will enable it to perform all its duties as part of the naval establishment, and at the same time to provide expeditionary forces when needed without disrupting its service at navy yards and without interfering materially with the training necessary for its officers and men to carry out properly the duties assigned them as part of the naval establishment.

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OVER- AND UNDER-ISSUES ON SMALL SHIPS

By Asst. Paym. J. B. Ewald, U. S. Navy

It is fairly well established that the issue of food to the general mess of a small ship requires a degree of exactness that is not to be expected in the commissary of a cruiser or battleship insofar as the limit of issues is concerned.

On ships of the larger types a substantial leeway can always be maintained simply through the large quantities of provisions handled and the small ratio of loss and waste as compared to the number of rations issued. In the case of a ship with a complement of 200 men or less the relative value of the ration is greater and for the over-issue of one component an under-issue of another must be immediately in sight. For an excess issue of one ration of meat nearly five rations of vegetables or twelve rations of sugar must be saved as an under-issue. Though this is true of the issues on any ship, it is held to be more nearly an inflexible rule on a small one.

To keep an exact statement of the condition of over- and under-issues is a task involving a considerable amount of time and work. Yet it is imperative for the reason that economy in the supply of food can in no other way be held in hand, as well as for the fact that the commissary officer is accountable in dollars and cents for an over-issue.

A commissary department serving attractively the greatest variety of foods at the least possible price is the ideal one and this cannot be accomplished unless an exact check is kept on the supply in such a way as to indicate the issues of the lower- and higher-priced ration components in their relation one to the other.

I have prepared a form which, I believe, may be used by the commissary officers on small ships to great advantage. Commis-

U. S. S. *ANNAPOLIS*
COMMISSARY DEPARTMENT

Place

Date

ARTICLE	QUANTITY	PRICE	EXTENSION
Bread, fresh		.032	
Flour, wheat		.0355	
Corn meal		.0355	
Bread, hard		.04	
Meat, fresh		.0844	
Fish		.0844	
Fowl		.0844	
Eggs		.2213	
Meat, preserved		.1475	
Meat, salt		.118	
Meat, smoked		.118	
Vegetables, fresh		.0172	
Vegetables, canned		.04	
Vegetables, dried		.32	
Cereals		.08	
Fruit, fresh		.0427	
Fruit, canned		.064	
Fruit, dried		.128	
Fruit, preserved		.064	
Coffee		.15	
Cocoa		.15	
Tea		.40	
Milk, fresh		.28	
Milk, condensed		.07	
Butter		.27	
Sugar		.05	
Lard		.1028	
Tomatoes		.04	
Salt		.01	
Pepper		.19	
Mustard		.16	
Macaroni		.06	
Cheese		.1532	
Vinegar and oil		.44	
Pickles and kraut		.0468	
Sirup		.32	
Spices		.4096	
Miscellaneous			
TOTAL VALUE			
NO. OF RATIONS			
AVERAGE PRICE			

sary stewards are usually required to submit a tabulated statement of the issues to the general mess during a day, and since the form shown here is probably as simple as any, it may be used with no additional expenditure of time.

While giving a true statement of the issues during a day it shows, with a very small ratio of error, whether there has been an over- or an under-issue and the value, in terms of the bureau's arbitrary prices, of the excess or shortage.

The prices shown opposite the several articles are adduced from the bureau prices as given in bureau memorandum 74 supplement. For convenience these prices have been so adjusted as to be applicable to the unit of measure instead of to the ration. For example, a ration (one and three-quarters pounds) of fresh meat is expended in the statement of over- and under-issues at $0.1475 a pound, at this rate, would be $0.0844; a ration (one thirty-second of a pound) of mustard according to bureau price is $0.005, hence a pound would be $0.16. By applying the same operation to each of the ration components the prices may be made to apply to the daily issues in pounds or gallons. By taking the straight bureau price of $0.1028 per pound for lard without regard for the amount of flour used as bread and by the same use of the price for fruits without the restriction by issues of vegetables the result is reasonably accurate. The expenditure of tomatoes is the only irregular allowance to be separately handled. This, without confusion to the rest of the schedule, may be easily done from the fact that the number of rations to issue is always known and the excess is applied to and incorporated in the quantities of canned vegetables used.

The maximum limit of issue of the navy ration in terms of bureau prices is $0.3225, correct to four decimal places. This is arrived at by multiplying the sum of all daily component prices by seven, then by adding the sum of prices of all weekly components and dividing by seven.

The difference between the maximum limit and the average price of actual issues may be clearly illustrated. Suppose that by dividing the sum of the extensions by the number of rations to which we are entitled we get an average price of $0.2861, then the average under-issue will be $0.0364, which, for one thousand rations, would show a total under-issue of $36.40.

The average daily prices thus arrived at can be used in determining the condition of expenditures to the general mess for any period of days whatever. During the time this form has been in use on the U. S. S. *Annapolis* it has shown an error of about two per cent, and the error falls invariably on the safe side by indicating the under-issues to be just that much less than they actually are.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

EXAMINATIONS FOR PROMOTION

By CAPTAIN T. W. KINKAID, U. S. Navy

Taking an examination for promotion from one grade to a higher one in the navy is at least as exciting as buying a ticket in a lottery, and it certainly involves the element of chance.

This is true even when the officer examined goes before the board in Washington; and when the candidate appears before the temporary examining board organized on a distant station, all kinds of guesses as to the probable character of the examination are in order. I think it may be safely said, however, that the candidate examined abroad has, as a rule, an easier time than his brother officer who receives his grilling before the regular board.

Conditions are often very unequal for officers due for promotion at about the same time. One may be able to get his examination promptly; the examination of the other may be delayed for months; one may have a pleasant environment with access to equipment and appliances to be described in the examination; the other may have had a hard grind on some uncomfortable little ship on a disagreeable station.

We all have heard of some of the old-time boards, each member of which was known to have a hobby. If the candidate were "wise" as to the respective hobbies and had ready answers for the pet questions, he need have no fear of not passing triumphantly; but Heaven help him if he knew only the routine facts of his profession!

Some of the examinations conducted by the old engineer examining boards were record breakers for duration. Many of the passed assistant engineers who emerged from the Civil War had a long time to wait on small pay for promotion to the grade of chief engineer. There was much professional stagnation, as naval

affairs in this country took a decided slump for fifteen years or so after peace had been restored. Besides, most of these men were stronger in practical than in theoretical engineering. Consequently, when the long-deferred orders to examination appeared, the candidate was often in for a spell of " heavy weather."

Examinations before the engineer board in Philadelphia sometimes lasted for a period as long as thirty or forty days, and I believe high-water mark was reached at fifty days.

At the present day we find officers whose promotion is due within a year making collections of " questions " from all possible sources. Doubtless some good is derived by the officer from his strenuous efforts to size up the possibilities of the situation. But, while the new commission doubtless appears to him an adequate reward for the efforts made, it seems doubtful that the energy expended has been directed to the best advantage.

A man who is making more or less excited efforts to cram for an examination, failure in which means a serious set-back to his career, is not capable of attending properly to his routine duties during the period of such preparation. And we know that this period often extends over many months. Hence an economic loss, some of which no doubt is preventable. Things got to such a pass in the days of the old engineer corps that a determined and successful effort was made to inaugurate a new and better system.

The change was made, if I am not mistaken, in 1891. The late Rear Admiral George W. Melville was engineer in chief, and he had as aid a very able young engineer, Walter M. McFarland, who was the prime mover in the reform of the engineers' examination which was effected.

In the McFarland system the examination for each grade was confined by departmental order to a definite list of questions published and issued to the service. For the grade of chief engineer, for example, there was a definite number of subjects, and under each heading there were appropriate questions, each question bearing a serial number.

The examining board was required to ask the candidate two questions, no more and no less, under each heading, from the published list.

Thus the candidate had foreknowledge of the questions which were to be asked, and knew the exact language in which they would be propounded. The only thing that he did not know in advance

was which of the available questions would fall to his lot. Consequently, he had to be prepared on all of the questions.

As a result of the adoption of the McFarland system, the time required for conducting engineer examinations was greatly reduced; the candidate was enabled to study intelligently and in line with departmental policies; and in general there was a conservation of energy.

I believe there is room for improvement in our present policy as to examinations. I would suggest the adoption of the following scheme:

First. Examinations to be conducted on the McFarland plan. Schedule of questions to be revised biennially.

Second. The number of subjects on which the candidate is to be examined to be restricted for each grade by departmental order. For example: For lieutenant, junior grade, navigation, seamanship, steam engineering, ordnance, language. For lieutenant, navigation, steam engineering, ordnance, electricity, military law, and so on.

Third. All officers to be examined at least a month before examination is due. Examination to be conducted on station.

I believe that the adoption of the above-mentioned system would be conducive to fairness without sacrifice of thoroughness; and that on the whole it would be found in accordance with the principles of scientific management.

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

STRATEGIC PROBLEMS AND THEIR SOLUTION[1]

By CAPTAIN R. VON LABRÉS, Imperial German Navy

Extracted and Translated by SURGEON J. F. LEYS, U. S. Navy

The strategic problems which a fleet, as a whole and in its separate divisions, has to solve are various and depend in the case of any war upon the material available on both sides for its prosecution and a due consideration of the objects to be accomplished. The object of every action is the defeat, or at least the serious injury of the opposing force. To accomplish this it must be decided whether one's own forces in comparison with those of the enemy justify a going forward on the offensive or whether, compelled to be on the defensive, one will await the enemy's appearance on one's own coast and, taking the offensive then, repel his attack.

The strategic situations for a fleet may be classified, then, as follows:

A. Those in which both fleets are handled on offensive lines.

B. Those in which a stronger fleet, taking the offensive, seeks the enemy on his coast and there engages him.

C. Those in which a weaker fleet awaits the enemy on its own coast and, on the enemy's appearance, takes the offensive against him with such support as the coast affords.

D. Those in which the weaker fleet, with the object of driving off an enemy already attacking its own coast, is compelled to remain on the defensive.

E. Those in which on both sides the political and strategic conditions are such that the final issue will necessarily be determined by land forces, and consequently it is the paramount duty of the fleets to support the operations of the army.

[1] From "Politik und Seekrieg."

F. Those in which it is not the aim to take to sea in force, but only to injure the commerce and the sea-communications of the enemy as much as possible.

A. The various problems for a fleet to solve when it has every reason to believe the enemy's fleet to be equally prepared to take the offensive in bringing matters to an issue will find their solutions upon the following principles:

1. The fleets, within their spheres of operation, or wherever they can expect to encounter each other, will locate each other by their services for security and information, whereupon—

2. They will engage each other in battle in the open sea.

3. Following up and using to the utmost any advantage gained, according to circumstances—

4. The defeated fleet will fall back for shelter upon its own coast which has been put in a condition for defense at the time that the fleet was fitted out. By availing itself of these resources of the coast it will be possible for this fleet to repel the further attacks of the enemy, employing the principles indicated under the foregoing heading C.

5. With the assumption of the offensive on the part of the battle fleets, the separate cruiser flotillas come into play in the rear of the enemy's battle fleet to attack his reserves and to inflict damage upon his coasts wherever and however this is possible, while at the same time—

6. The battle fleet operating on the enemy's coast and away from its own must take precautions for the protection of its own coast from such enterprises by cruiser flotillas.

7. Further, the maritime commerce of the enemy must be attacked by the capture of ships and of enemy cargoes (contraband) under neutral flags, which activities come under the head of predatory operations (sometimes in the past carried on by privateering).

8. This leads us to the protection of our own commerce, by the convoying of merchant ships, which involves encounters with enemy cruisers.

9. According to the results of early battles, we come to the blockading of the enemy's coast or of a part of it, or to the raising of a blockade, if one of the fleets be strong enough to attempt such a measure.

10. Certain detachments of the fleet may be employed to coöperate with the army, especially if its operations lie near its own or the enemy's coast, or where navigable rivers offer easy communication with the sea or where they constitute a barrier between the opposed armies.

Operations, according to circumstances in different wars, will take place similarly in the secondary fields of operation, usually on a reduced scale and with variations. It may happen, too, for example, that during war between two powers with both sides taking the offensive in the principal sphere of operations as indicated under heading A, their activities in one of the secondary fields of operation may be conducted with other objectives in view and may present problems the solution of which would come under the headings B to F. The possibility is not to be overlooked that though both parties at war be possessed of some forces in one of the secondary fields, no operations may take place there, because it is evident from the first that the issue will be decided in the principal theater of war.

B. The problem in offense, for a fleet seeking the enemy on his coast or wherever he may be found in order to engage him, involves the following operations:

1. The search for the enemy's fleet within his own chosen sphere of operation by the employment of the security and information service.

2. To engage his fleet when opportunity is afforded.

3. To make fullest use of any advantage gained, or be prepared if necessary to fall back upon the home coast.

4. To capture a base in advance in case battle be not joined before this can be done, in order that the fleet may use it as a point of departure for operations upon the enemy's coast or as a refuge in case of a defeat.

5. To engage the coast defense fleet and flotillas of the enemy which rest upon his coast and to attack and damage the fortifications and resources of his coast in every possible way that will contribute to his defeat or his injury.

6. In certain conditions, to establish a blockade of the enemy's coast in whole or in part.

7. To pursue the predatory activities that will injure his trade and communications.

8. At the same time to protect its own commerce by convoying merchant vessels and fighting the enemy's cruisers.

9. Detachments of the fleet can also act in joint operations with the army, especially where the field of operations is near their own or the enemy's coast, or where they can serve as barriers between the contending armies.

10. Though taking the offensive in operations upon the enemy's coast, nevertheless the fleet must bear in mind the necessity of precautions for the defense of its own coast and of its own reserves and reinforcements against enterprises undertaken by flotillas of the enemy.

C. The problems confronting a fleet compelled to await on its own coast the offensive attack of a stronger fleet are as follows:

1. To put its own coast defenses in order and to establish such a condition of its entire fleet, comprising battle fleet, coast fleet and flotillas, as to have at disposal all available forces at any time.

2. To send cruiser flotillas to harass and injure the approaching enemy while still at a distance, finding opportunity perhaps to attack him in the rear.

3. Employing its information service at long distance in order to learn of the approach of the enemy's attacking fleet and know its strength, composition, etc.

4. To hinder the enemy from gaining an advanced base, attacking him with submarines in the course of his operations for that purpose.

5. Incessantly to harass and injure the enemy by fighting his scouts and screens day and night wherever opportunity can be found.

6. If possible, to make night attack upon the enemy's main fleet cruising near the coast.

7. If the enemy has been shaken by this, to take the offensive and engage his fleet by day.

8. To bear in mind the desirability of bringing about a fleet engagement within navigable waters on the coast with the support of shore fortifications.

9. In case of a blockade by the enemy, to attack his blockading vessels.

10. To attack with cruiser flotillas the enemy's reserves and convoyed trains, whether in the neighborhood of his ports of

departure, en route at sea, or near the home coast, and if possible to inflict damage upon the enemy's base ports.

11. To pursue the predatory activities that will injure the enemy's commerce and communications.

12. At the same time to protect its own communications and fight off the enemy's cruisers as far as circumstances make it possible.

13. To carry on joint operations with the army where these are to take place along the attacked coast, or to protect navigable rivers, especially where these constitute a barrier which must either be crossed by land forces or defended against such crossing.

D. If the entire fleet be too weak to engage in battle in the open sea and compelled therefore to hug its own coast, all the foregoing principles which apply to open-sea fighting are eliminated. The defense of the coast, giving due consideration to the available material, will be along the following lines:

1. Putting the coast itself in condition for defense, and so making ready all ship-material as to have all the available force at disposal.

2. Employing the information service within the field of coast operations to ascertain the approach, strength, and composition of the enemy's fleet, harassing and injuring him in case his final near approach be at night.

3. Hindering the enemy from gaining an advanced base, attacking him with submarines in the course of his operations for that purpose.

4. Fighting the enemy's scouts and screens and harassing and injuring his fleet at every opportunity.

5. Night attack upon the enemy's fleet with the torpedo flotilla as opportunity offers.

6. Repulse of the enemy's attacks within coast waters and with the support of shore batteries, as far as possible.

7. If the enemy set up a blockade, attack upon his blockading vessels.

8. Attacking the enemy's reinforcements and his convoyed trains near his own coast.

9. Carrying on predatory operations to the injury of the enemy's commerce and communications.

10. Carrying out joint operations with the army where these are to take place along the defended coast, or protecting navigable

rivers, especially when these constitute a barrier which must either be crossed by land forces or defended against such crossing.

E. If the issue of the war be dependent upon army operations and if it be the sole function of the fleet to assist the army, the questions to be solved by the naval forces will be insignificant and of little influence upon the result.

For stronger fleets, or in case one of them is stronger than the other, the circumstances would raise questions to be solved according to the principles already laid down under headings A to B. In general, an effective support of the army would be possible only to the stronger fleet. Probably the following strategic propositions would be presented:

1. Each fleet would maintain a close watch upon the other, neither risking in the beginning the chances of battle.

2. Support and assistance of the operations of the army by the fleet, supposing the enemy to be not strong enough to hinder this coöperation.

3. Coöperation where streams are to be crossed or to be obstructed and fighting off of the enemy's flotillas.

4. Making secure the defense of the coast, attacks by land and naval forces upon single positions, or repelling such attacks.

5. If the occasion arises, encounter and battle between the fleets.

6. Despatch of cruiser flotillas to injure the enemy on his coasts.

7. Maintaining a predatory warfare upon the enemy's commerce and sea communications.

F. In wars where, because of the lack of powerful fleets and the remoteness of the theater of war, no encounter at sea is possible, only a predatory warfare can be waged. The naval force will be concerned then:

1. To injure the maritime commerce of the enemy along his most important routes.

2. To take measures to protect its own sea communications.

3. To take appropriate measures for the security of exposed trade ports on its own coast.

The strategic problems which will occupy a fleet in war, as indicated in what has been said, are of many sorts, and to determine what services are demanded of the total sea force, according to the military situation and the political objects to be attained,

will not be easy. Among the many possible strategic enterprises which might be successfully carried out, that only is to be considered which will accomplish an emphatically useful purpose. It must not be overlooked that even a very strong fleet having interests all over the world to protect and being in a position to injure the enemy can still have only one object to accomplish, namely, *to attack and defeat the enemy where he appears in his greatest strength and where he can be most severely injured.* To this end our own offensive fleet, according to a basic principle laid down by the great master of war, Napoleon, must be superior to that of the enemy, must indeed be as strong as it is possible to make it; "superior force" in a tactical sense depending upon both the number and the special serviceability of the component units, serviceability being made up of many factors.

In any case the sufficiency and efficiency of a fleet for any probable war with regard to the various points enumerated under headings A to F are to be estimated with reference to its own available material, the auxiliary support on its coast, and an exact knowledge of the enemy's fleet material and further resources.

Only upon due consideration of all these factors will it be possible to undertake the organization of the ship-material available, in doing which the best should be allotted to the fleet operating in the principal theater of war. Whatever the number and location of battle fleets to be established, in their organization only strategic objects are to be considered, whereas in the assignment of ships to certain groups both strategic and tactical considerations should govern.

The assignment of fleet material to secondary theaters of war, to coast fleet and flotillas, may well present many difficulties, in view of the strategic considerations hereinbefore stated, giving opportunity for the master mind to act with judgment within the limitations imposed.

The stronger the fleet as a whole, the more various the tasks it is called upon to accomplish, the more difficult will appear the work of organization. The difficulties will be fewer by far for those forces whose operations will be confined entirely to the principal theater of war and who for this reason need only one battle fleet.

In the strategic organization of the entire fleet, due consideration must be given not only to the political and military objects of the war as clearly laid down in advance, but also to the probable distribution of the enemy's forces and the probable ends which he will aim to accomplish by his operations. How the proper organization shall be or can be effected depends upon the special circumstances in which the parties at war find themselves, and will require a different solution in each case.

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SAFETY AT SEA

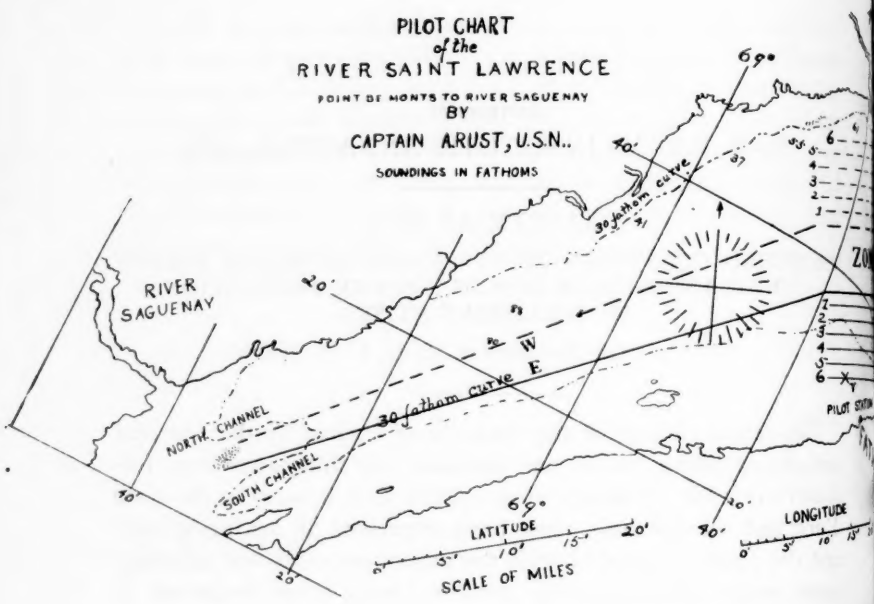
PROPOSED COASTWISE PILOT CHARTS SHOWING SAFETY ZONES AND DANGER SPACES FOR THE PREVENTION OF COLLISIONS AT SEA

By CAPTAIN ARMISTEAD RUST, U. S. Navy

The recent sinking of the *Empress of Ireland* by the *Storstad* with its appalling loss of one thousand and thirty-two lives, followed so closely by other collisions such as that between the *New York* and the *Pretoria,* must have impressed all seafaring men and the public in general with the urgent necessity for adopting some means for preventing such accidents from occurring in the future.

Such a disaster under the conditions existing at the time can only be due to criminal negligence and inefficiency somewhere, not necessarily on the part of the officers of the ships concerned, let it be understood, but this accident was primarily owing to the faulty system of navigation in practice which allows two ships bound in opposite directions to pass so close to each other as to involve danger when there are miles of open water available so that a "safety zone" of sufficient width might be laid down on the chart which would render such a collision as that between the *Empress of Ireland* and the *Storstad,* or between the *New York* and the *Pretoria,* a physical impossibility.

The blame should not rest entirely on the officers of the ships involved so long as a practice in the navigation of vessels is permitted to exist which places the safety of two ships and hundreds of lives with millions of dollars worth of property wholly on the correct sending, receiving, proper interpretation and execution of signals made by steam whistles in an emergency. This extremely dangerous way of navigating ships must be changed or else it is only a question of time before similar accidents are bound to occur.



A SUBSTITUTE FOR [illegible]ELVIN'S S

A, brass [illegible]eter.

P, [illegible] joint, J

H, 1/8" [illegible] admit wat

RR', Soft [illegible] washer to

B, wat[illegible] glass, 1/4" or

W, sea[illegible] holding cor

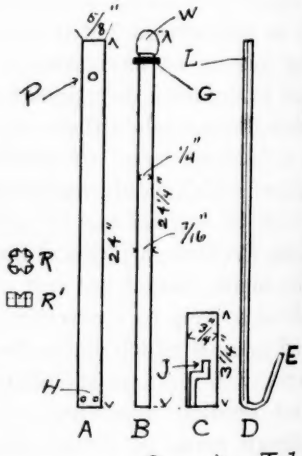
G, rub[illegible] to pro

C, cap [illegible] joint,

D, str[illegible] drawing

E, end [illegible] secured t

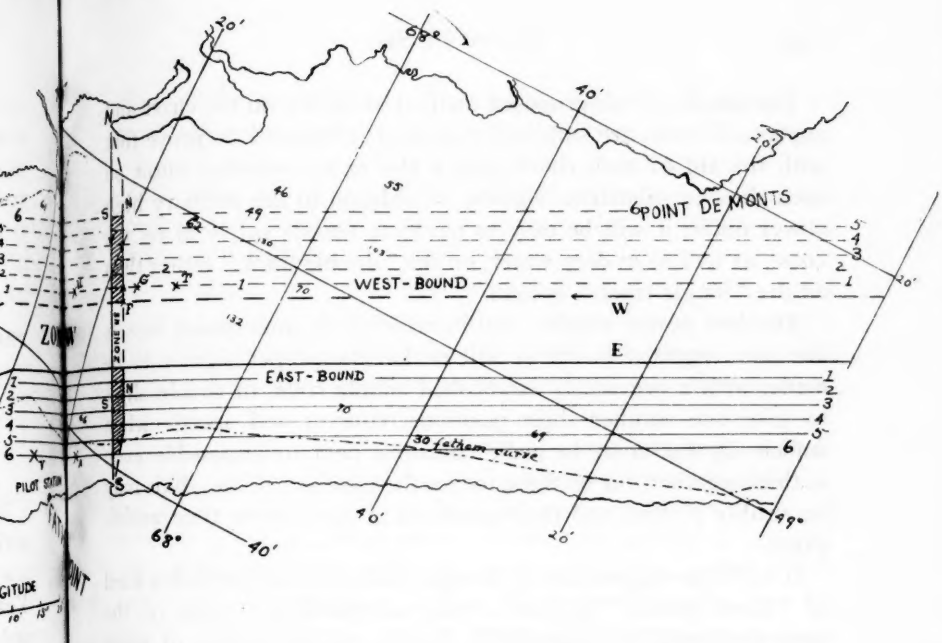
L, regi[illegible] drawn u



Sounding Tube
Made and Used by
Captain John Martin of
the late Norwegian S.S. AKERSHU

For the [illegible] to substi[illegible] dimensio[illegible] to be t[illegible]

A. [illegible]



E FOR KELVIN'S SOUNDING TUBE.

A, brass outer tube; 24" long; 5/8" internal diameter.

P, bayonet joint, J, of cap, C.

H, 1/8" hole to admit water.

RR', Soft rubber washer to fit at bottom of A.

B, water glass, 1/4" or 5/16" internal diameter.

W, sealing wax holding cork disc in place.

G, rubber ring to protect W from contact with A.

C, cap with bayonet-joint, J, for closing top of A.

D, strip of drawing paper about 3/16" wide

E, end secured to outside of B.

L, registering line drawn with copying-ink pencil.

For the glass tube, B, it will be convenient to substitute a brass tube of the same dimensions. There is no need for this to be transparent.

A. Burt, Captain, U.S.N. Ret..

The details of the proposed method as shown on the chart and explained herein are sufficiently clear, it is believed, to prove that with the aid of such charts and a low power wireless outfit on each ship, or submarine signals, in addition to the ordinary high power outfit, it will be easy to navigate vessels safely along the coast, as well as in deep water, on the " double track " rather than on the " single track " system.

The low power wireless outfit, which it is understood vessels are now required to carry, will enable the proper signals to be made, with a previously established simple code, to enable ships to give one another their positions, courses and speeds when sufficiently far apart to make collisions next to impossible even in thick weather, for by these means the positions of the ships may be readily plotted and their positions at any future time anticipated.

It will thus be possible, if thought advisable, to establish a kind of " block system " so that a vessel overhauling another on the same track will be compelled to keep a certain number of miles astern of the latter until the positions of the ships are accurately fixed so that they may pass with safety.

On the chart the tracks are shown with a " safety zone " of five miles between the nearest opposite tracks, though when practicable this zone should be much wider and sometimes it may have to be narrower. Each ship should be required to keep as near as possible to the track as laid down on the chart.

The " danger spaces " are shown by cross lines where the tracks intersect and will serve as warnings to ships approaching these " crossings " to " Stop, look and listen." The unexpected danger is the one most to be feared, and by requiring all steamers to cross the tracks of others at the points laid down on the chart will cause each ship on approaching and traversing a " danger space " to use the utmost caution.

The different routes have code letters as shown. It shall be the duty of all ships in thick weather to signal their " track letters." On receiving a " track letter " from another vessel each ship will repeat her " track letter " followed by her latitude when her course has more northing or southing, or by her longitude when it has more easting or westing. The latitude and longitude will be given in degrees and minutes and may be followed by N, S, E, or W, as the case may be, if necessary. The speed will

follow to the nearest knot. Thus we see that this short message, consisting of one letter and as a rule not more than six figures, will in all cases give sufficient data to accurately locate all ships within reach of the low power sets. If considered preferable a simple code consisting of letters alone might be arranged and printed on the chart.

By adding one or at most two more digits to the code signal we may expand this system from the " double track " to a multi-track " system and locate each ship on her proper speed line and require all ships on that line to maintain the standard speed of that line.

Vessels whose speed is ten knots or less will keep on the boundary line of the zone as close as possible and when necessary to pass the passing vessel will do so by turning into the zone and return to her track ahead of the other vessel as soon as possible.

What is said above applies to merchant steamers only. Public vessels when cruising and sailing ships are free to go into the neutral territory and it will be their duty to keep clear of the regular tracks of steamers at all times. A public vessel bound from one port to another directly will be governed by the same rules as other steamers, and vessels making a port will take the nearest track for inward bound vessels in case they find themselves off their own tracks.

The laws governing our coastwise shipping, and all other shipping, should be modified as soon as possible so as to require a ship upon entering a " danger space " to go at such a moderate rate of speed that she shall be able to stop her headway within " the range of visibility ahead of the ship." If it be so thick that a ship cannot see ahead any distance, then this rule would require the ship to stop until she can locate all vessels in the vicinity. She may then proceed cautiously through the " danger space," *provided* she hears no other steamer's whistle.

When by the foregoing rule a steamer has been compelled to stop and hears the fog whistle of another steamer, both ships will remain stationary and exchange " track letters " by whistle. If these belong to the same zone but are not the same letter it shows that one or both ships are out of position and are near each other bound in opposite directions, and they will remain stationary or anchor if on soundings until they can see sufficiently far ahead to proceed with safety.

If at any time when outside of a "danger space" a steamer hears the fog whistle of another both shall slow so as to be able to stop "within the range of visibility ahead" and exchange "track letters" by whistle in order to determine whether they are bound in the same or opposite directions or crossing and if very thick this means "stop." It is evident that this is the only way that such collisions as that between the *New York* and the *Pretoria* may be prevented, if the report is correct that the *Pretoria* was very much out of her reckoning. When this is the case the reports by wireless will be very misleading and in all cases they must be verified by the whistles when vessels approach each other in a fog.

In this case only one letter sounded on the whistle is necessary to give the required information. If they are bound in the same direction they may proceed safely at the speed of the slower until the weather clears.

More buoys of the most improved type should be used wherever possible so as to give separate routes for incoming and outgoing steamers. In thick weather traffic through narrow, dangerous channels should alternate in direction, allowing no ships to pass in opposite directions at the same time. When the channel is very narrow and very deep this should apply in clear weather also, for no one can tell at what moment the steering gear of one ship or the other may suddenly become deranged. Unless conditions are such that a ship may be immediately grounded to prevent her sinking it is evidently very reckless to take such chances, particularly with passenger steamers.

The chart shows the mouth of the St. Lawrence River and the vicinity of Father Point, near which place, at A, the fatal collision between the *Empress of Ireland* and the collier *Storstad* occurred at about 2 a. m. on the morning of May 29, 1914.

The *Empress of Ireland* was outward bound and had discharged her pilot at the station off Father Point, and the *Storstad* was standing in for the same station to pick up a pilot. This happened to bring the two ships very close in passing and headed in nearly opposite directions, making the conditions somewhat similar to those obtaining in the collision between the *Monroe* and the *Nantucket* off Cape Charles, Virginia, about 2 a. m., January 30, 1914.

The report of the Commission of Inquiry[1] states that there was no dense fog for any appreciable length of time, that the vessels were in sight about six miles apart, and further that a fog-bank obscured the lights at a critical moment, requiring an exchange of emergency signals.

The evidence shows that had the weather remained clear and had each ship held her course, no collision would have occurred. The chief officer of the *Storstad* was at fault in assuming that the ships would pass red to red, and in putting his helm to port in order to increase the distance between the ships, which were as a matter of fact, passing green to green, and this error caused the disaster.

The important question to examine at present is why should vessels bound in opposite directions ever be allowed to pass close enough to each other to involve risk of collision when there is ample sea-room for a "safety zone"?

With what has already been said it is hardly necessary to explain the accompanying pilot chart in detail and a few additional words will suffice.

This chart requires all inward bound steamers to keep north of the zone EW, and all outward bound steamers to keep south of this zone, which is five miles wide. Now it is evident that had each of these steamers had one of these charts and followed it this collision would have been impossible. Further, the use of this chart would fix absolutely the responsibility for an accident in all cases. In the present instance the *Storstad* would have been at fault, as she was on the wrong side of the zone and in the territory of the other ship.

So much for this case in comparatively clear weather, if the present reports are correct. What more concerns us is the utility of these charts in thick weather.

Suppose the weather thick and when the *Empress of Ireland* was at V the following message was received on the wireless or submarine signal apparatus:

1W 68 12, which means, "speed line W1; longitude 68° 12′ W; making 11 knots; west bound; position T." Ordinarily the numerical portion of the message consists of six figures following the "zone letter," W in this case. The first four stand for the latitude or longitude in degrees and minutes and these may be

[1] See Appendix.

followed by N, S, E, or W, as the case may be, and the last two figures, when there are six following the zone letter, indicate the speed of the ship in knots. When no speed is given it means that the ship is making the speed required on her speed line, thus: W = 10 knots, 1W = 11 knots, etc.

The *Empress* answers: 6E 68 33 12, which means, "east bound; speed line E6; longitude 68° 33′; speed 12 knots; position V." The *Empress* having discharged her pilot, should change course to port to gain the line E2.

There is nothing in these messages to cause anxiety to either captain; in fact, the single letter "W" was all the captain of the *Empress* need receive to know that the ship sending it was west bound and would pass at least 11 miles north of him when abeam, position U. The captain of the *Storstad* would know when he received the letter "E" that the ship sending it was east bound and would pass at least six miles south of him when abeam, position A.

Zone NS is for an imaginary ferry across the river to show the "danger spaces" and how crossing steamers signal to keep clear as they would have to do if crossing at sea. Small local steamers would not have wireless and submarine signals and should be given the right of way. Suppose when at G the *Storstad* received the signal by Morse Code on steam whistle NW. This would indicate a ferry boat north bound at F, and she has the right of way.

At sea all vessels approaching crossings in thick weather will keep a lookout for messages from other vessels bound for the same crossing and, as shown above, the short message consisting of one letter and seven figures will give the position, course and speed of any vessel within the radius of the low power outfits in ample time to allow the positions of the ships to be plotted and to avoid collisions.

The neutral water within the different "safety zones" could be utilized by tows and small low power vessels with a secondary "safety zone," say one mile wide between the opposite tracks.

The following are the chief advantages that may be claimed for the proposed system:

1. It will be observed that these coast-wise pilot charts merely systematize the present practice. There are no hard and fast rules in regard to speed to hamper the movements of individual

ships and restrict traffic, with the exceptions of reducing speed when in a "danger space" and when overtaking another ship, and this is already required by the present rules for preventing collisions at sea. All that is demanded is that ships going in certain directions shall keep on certain tracks, while those going in opposite directions shall keep on other tracks laid down on the chart. The use of these charts in no way conflicts with the present international rules for preventing collisions at sea.

2. By requiring ships to keep as near as possible in given tracks when the weather is clear, their positions may be more accurately determined and transmitted by wireless or submarine signal when the weather becomes thick.

3. The establishment of the "danger spaces" will enable ships to know where and when to expect to meet others and by requiring them to go at such a speed that they must be able to stop their headway within "the range of visibility ahead of the ship" the danger of collision will be prevented to a very great extent. It must be remembered that no one can maintain for hours at a time a maximum efficiency in watchfulness any more than a runner can make his best speed for hours but which he might easily maintain for half an hour.

4. Though ships are required to proceed more slowly than at present through the "danger spaces" yet the "safety zones" will enable ships going in opposite directions to proceed faster along the safe portions of the track when clear of the "danger spaces."

5. The "speed lines" will prevent rear-end collisions between ships going in the same direction. For though a ship making 15 knots might due to errors in her reckoning be on the 13 or 17 speed line yet it is not likely that she would be much further out, and consequently whether she were overtaking another vessel or being overtaken by her the rate of approach would be so slow that there would be no danger of collision even in thick weather. Each vessel would have ample time to get the speed and position of the other.

6. As no ship is allowed under the rules to pass on any speed line except those bounding the "safety zone," a ship finding herself astern of a slower vessel must reduce her speed to that of the latter, thus establishing a "block." If she desires to increase her speed she must, if out of position, port her helm and take her proper speed line, or else the slower vessel, if out of

position, must starboard her helm and take her proper speed line. If both are out of position the slower vessel ahead will change course to port and the faster ship, astern, will change course to starboard until both are on their proper " speed lines."

Charts have in the past been used for navigation purposes only, to a very great extent, for piloting vessels on the high seas and along the coasts in order to insure the safety of vessels from shipwreck. Up to date no really systematic attempt has been made to use charts and modern methods of signalling to prevent collisions between vessels and obstructions to navigation, such as icebergs and derelicts, except in the case of the " steamship lanes " proposed by Lieutenant M. F. Maury, U. S. Navy, in about 1855, and which was not adopted until many years later, and the pilot charts issued by the hydrographic offices, which, as valuable as they are, cannot be made to fill the place of the charts here proposed. With these charts in universal use the only danger from collision is from one vessel overtaking another in thick weather. Now if ships plot their positions when 100 miles apart and replot at intervals, their rate of approach being known, errors of position will soon be detected and each will verify and check up her position, therefore:

8. The use of these charts will demand better navigation on the part of the officers of all steamers and sailing ships, both in the way of taking sights and in the intelligent use of the sounding machine; about which more will be said later, for in case of a collision that ship which is out of her track will have the burden of proof on her to show good reason why she did not know her position.

9. When sailing ships are clear of the tracks of steamers laid down on the chart they will know that they are safe from steamers at least, and when they are in those tracks they will know that they are in danger and being fully warned they will see to it that their lights are burning brightly, properly trimmed and if the weather is thick they will be prompted to keep their fog horns going in a way that will make a real noise.

10. To promote the safety of life and property at sea all large sailing vessels should be required to carry:

(a) An efficient fog horn operated by compressed air.

(b) A small gun to be used as an emergency fog signal when a steamer is discovered close aboard.

(c) An efficient sounding machine.

(d) A low power wireless outfit operated by a gasoline or oil motor for use in thick weather when near steamer tracks or in other times of danger.

(e) As a safeguard against one ship overtaking and ramming another, ships should be required to carry fog buoys, to be towed astern when a fog whistle is heard in that direction.

Let not the sailing ship be despised. A steamer filled with passengers will sink just as quickly when struck amidships by a sailing ship loaded with pig-iron or coal going 10 knots as though this vessel were propelled by some kind of machinery.

11. Steamers passing along a track will soon locate all derelicts and icebergs in the vicinity of this track and thus all shipping in the immediate vicinity may be promptly warned.

12. From the above statements it is believed that it must be conceded that the use of the proposed coastwise pilot charts will greatly decrease the number of collisions between vessels in clear weather as well as in thick weather and therefore that many valuable lives and much property must eventually be saved.

In using these coastwise pilot charts an efficient navigational sounding machine will be found to be absolutely necessary in order to verify or ascertain the positions of vessels in thick weather on soundings.

Lord Kelvin's navigational sounding machine has contributed more to safe navigation in fog than any invention ever made and all sea-going vessels should carry this or a similar machine.

The first cost of this machine and the cost of the sounding tubes used with it have prevented its more general use on board sailing ships and on some steamers. Thanks are due therefore, from the seafaring fraternity to the ingenuity of Captain John Martin for an improved sounding tube equal in accuracy to that of Lord Kelvin and possessing the advantage that it may be used over and over again any number of times.

The various parts of the tube and its attachments are shown in the sketch, and the description of this tube given below was taken from the Pilot Chart of the North Atlantic Ocean for January, 1909, published by the U. S. Hydrographic Office, Washington, D. C.

DEEP-SEA SOUNDINGS

A SUBSTITUTE FOR THE KELVIN CHROMATE OF SILVER TUBE

Captain John Martin, of the Norwegian steamship *Akershus*, communicates the following to the U. S. Hydrographic Office:

"Running short of Lord Kelvin's glass tubes for deep-sea soundings and finding the price charged in America, 40 cents, rather high, I tried to find some substitute for the chromate of silver (unobtainable here) and succeeded.

"I bought a one-fourth inch (inside diameter) water-gauge glass of the same length as Lord Kelvin's tubes, closed one end with a flat piece of cork, a small rag over it, and some sealing wax. Next I got a sheet of drawing paper and cut it into narrow strips at a book-binders. (In my first trials I cut strips from the margin of Admiralty charts.) Along the middle of the paper strip I draw a line with copying-ink pencil. The paper strip is then shoved up the glass tube, forming a blank scale. The lower end of the strip is turned round the edge of the tube and tied with a piece of cotton thread to prevent the paper being displaced by the water as it forces up the tube. The glass tube must be perfectly dry inside, and the paper strip should not be ruled and put in place much before it is to be used, as the ink-pencil line may become indistinct through moisture.

"The tube is now used in the same way as Lord Kelvin's. The depth is read off from the boxwood scale. The ink-pencil line will distinctly indicate how far the water has reached. (Dip a strip of paper with an ink-pencil line on it into some water, and it will be seen how distinct the marking is.)

"The guard tube to put the gauge glass in was made from an old condenser tube.

"The only drawback with this instrument is that it lacks the impress of authority. I have used it simultaneously with some Kelvin tubes, and found it to register the same.

"The paper strips are very convenient for writing on, and when dried, after being used once, may be used a second time by ruling a new line on the other side."

The writer has two improvements to suggest in Captain Martin's sounding tube which is to substitute a brass tube of about one-fourth inch internal diameter and of the same length for the glass water-gauge tube "B." A brass tube could be so accurately bored out that there would be no variations in its inside diameter and its upper end could be threaded and fitted with a brass cap and rubber gasket or brazed on to prevent any possibility of a leak. We would thus have a cheap and indestructible sounding tube and a more reliable one than those in general use which may sometimes register falsely due to a slight leak on account of their upper ends being closed with sealing wax. The second improvement is to provide sheets of heavy paper on which the scale of

soundings shown on the box-wood scale are printed, from which the strips may be cut as required. Not only will scales thus prepared prevent mistakes in reading off the soundings, but plotting the soundings will be expedited and the box-wood scale may be kept locked up for an emergency.

A dozen of these tubes could be easily provided and as each one is used it could be quickly dried again by heat.

A suitable sounding tube being thus placed within reach of all it will be a simple matter for any machinist to make a reel to carry the sounding wire. This should be of galvanized steel strand about 1/16 inch in diameter. The reel should have a brass axle and bearings and be fitted with a brake and in a box to protect it from the sea and weather.

The sounding machine here described may be provided for all steamers and all sailing ships and they should all be required to have them except the smaller coasting vessels.

The belief in an unsinkable ship has already cost many hundreds of lives and the loss of many millions of valuable property. After the tragedies of the *Titanic*, the *Monroe*, the *Empress of Ireland* and some others which have occurred recently it is high time for the various governments, steamship companies and the public to realize that under certain conditions attending collisions, at the present stage of the art of building ships, any ship may sink. It will therefore be wise to take prompt measures to prevent these collisions. If an ounce of prevention is worth a pound of cure on shore, then it is worth a ton at sea.

The gist of this whole matter is that it is our duty to guard against collisions—to make them as nearly impossible as we can —and not merely provide remedies for the results of these collisions.

APPENDIX

Extracts from the report of the Commission of Inquiry into the casualty to the British steamship *Empress of Ireland*, which sank after collision with the Norwegian steamer *Storstad*, in the St. Lawrence River, on May 29, 1914:

PAGE 10. STORY OF THE "EMPRESS OF IRELAND"

. . . . "It was a beautiful and clear night with a young moon and stars shining but before reaching Father Point, a slight fog had been met on two occasions (1) between Red Island and Bic, and (2) between Bic and Father Point, on both of which occasions speed was reduced to half and slow and the whistle was used.

"The pilot was dropped about a mile north of Father Point gas buoy at about 1.20 a. m., the weather being then fine and clear. A course of N 47 E magnetic was then set in order to obtain an offing from shore, and the vessel proceeded to sea at full speed, which the master states was between 17 and 18 knots per hour.

"After the vessel had been running on this course for a little time, the Cock Point gas buoy was sighted by the lookout in the crow's nest and reported, and shortly afterwards just before getting Cock Point on the beam, the mast head lights of a steamer, which subsequently proved to be the *Storstad*, were sighted between three and four points on the starboard bow, approximately six miles away, the weather at that time being fine and clear.

"Navigation from the moment of sighting the *Storstad* until the fog intervened.

"After running on the course N 47 E magnetic for about eighteen minutes, to a point at which Cock Point buoy was about two and a half miles away on the starboard beam, and about four and a half miles from Father Point, Captain Kendall, considering that he had made the necessary offing from the shore, altered his course to N 76 E by compass or N 73 E magnetic, with the object of proceeding down the river.

"When this change had been carried out, the masthead lights of the *Storstad* were still visible, about a point or a point and a half on the starboard bow, about four miles away, and it was intended to pass the vessel starboard to starboard.

"At this moment Captain Kendall, going to the higher bridge, verified the heading of the ship by the standard compass and took the bearing of the lights. He stated that he found the *Storstad* lights were bearing N 87 E by compass, 11 degrees on his starboard bow, and that her course would therefore take her easily to starboard of his ship.

"A little later Captain Kendall returned to the navigation bridge, sighted the green light of the *Storstad* off his starboard bow, and about the same time a fog bank was seen coming off the land, and dimmed the lights of the *Storstad*.

NAVIGATION IN FOG

"As soon as the fog began to affect the *Storstad's* lights the engines of the *Empress of Ireland* were stopped, and put full speed astern, and the whistle was blown three short blasts signifying that this had been done."

. . . .

PAGE 11. THE STORY OF THE "STORSTAD"

. . . . "The vessel was under the command of Captain Thos. Anderson, who had given standing orders to the chief officer that he was to be called in case of fog, and in any case, he was to be called six miles before the ship reached Father Point to take on the pilot.

"Abreast of Metis Point, the estimated distance of the *Storstad* from the shore was about four miles, a course was laid of W 1/4 S magnetic and the ship ran by the patent log six knots through the water, this distance, being, however, subjects to a slight allowance in respect of the tide. The

course was then changed to W 1/2 S magnetic, and the ship ran by the patent log five knots. Shortly afterwards, about 1.30 a. m., the course was changed to W by S. Just before the change was made or just after, the masthead lights of the *Empress of Ireland* were seen approximately two points on the port bow of the *Storstad* about 6 or 7 knots away. They were at that time open to starboard . . . .

"Navigation from moment of sighting *Empress of Ireland* till fog intervened.

"Six or seven minutes after sighting the masthead lights, the green sidelight of the *Empress of Ireland* was seen about a point and a half on the *Storstad's* port bow, apparently 3 to 5 miles away. The *Empress of Ireland* was showing her green light for an interval, and was then seen to change her course. Her masthead lights came into line, and she showed her red light. . . . . "

The Commission concludes its report as follows, page 30:

It has not been suggested during our inquiry that the catastrophe was in any way attributable to the arrangements made by the Canadian Government for the navigation of the St. Lawrence, nor have we any reason to suppose that these arrangements are in any way unsatisfactory; but we suggest that it might be worth while for the government to consider whether it may not be desirable and practicable to arrange for the picking up and dropping of pilots to be done at different points so that incoming and outgoing ships may, so far as is possible, be relieved of the necessity of crossing one another.

(Signed) MERSEY,
E. MCLEOD, C. J.,
A. B. ROUTHIER.

We concur:

(Signed) W. F. CABONE,
L. A. DEMERS,
J. J. WELCH,
P. C. W. HOWE.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OPTICAL PRINCIPLES AND THE DESIGN OF TELESCOPES FOR NIGHT USE

By LIEUTENANT F. J. CLEARY, U. S. Navy

PREFACE

The following article was written to bring before the officers of the naval service a few of the more interesting optical principles and their relation to the development of modern naval gun-sighting telescopes.

There has been no attempt to make this article a complete treatise on optics and any discussion of a technical or mathematical nature has been avoided.

As this article is intended for general circulation, it was necessary to omit all reference to any special features of construction of the instruments used in the U. S. Navy.

Attention is called to an article on "Optical Glass Manufacture and Optical Faults and Tests," appearing in a recent number of the Journal of the American Society of Naval Engineers.

This article is subdivided into sections as follows:

Section I. Introductory.

Section II. Elementary terrestrial telescope. Parallax.

Section III. Focusing caps.

Section IV. Total reflection in prisms. Penta prisms.

Section V. Chromatic aberration. Achromatic lenses. Secondary spectrum.

Section VI. Spherical aberration.

As far as possible each section is complete in itself, so that the sections may be read independently.

Especial attention is called to Sections II and III.

In the preparation of this article the following have been consulted: Lieut. Comdr. Mustin's personal notes. "Optical Tables and Data," Silvanus Thompson; "Light for Students," Edwin Edser; "Practical Light," Reginald Clay.

SECTION I

INTRODUCTORY

The present high standard of efficiency of the ships of the U. S. Navy at long range target practice, and at night torpedo-defence practice, is due to many correlated factors; but there is no single factor that has played a more important part than the development and extensive use of the modern gun-sight telescope.

It can be stated without hesitation that the ranges at which target practice is habitually held would be impossible with the old type of telescope.

The application of the telescope for gun-sighting purposes and its development to its present perfected state are due largely to three men: Rear Admiral Bradley A. Fiske, U. S. Navy; Mr. George N. Saegmuller, for many years a well-known instrument maker of Washington, D. C., and now vice-president of the Bausch & Lomb Optical Company, Rochester, N. Y.; and Lieut. Comdr. Henry C. Mustin, U. S. Navy.

Rear Admiral Fiske, if not the originator of telescopic sights, was at least the first officer to suggest their use in the U. S. Navy, and to carry out his suggestion in actual practice.

Mr. Saegmuller has been identified with the development of gun-sighting telescopes since their inception, the first telescopes being constructed by him before the Spanish War at the request of Commander W. T. Sampson, U. S. N., at that time Chief of the Bureau of Ordnance.

Mr. Saegmuller has constructed practically every telescope used in the U. S. Navy since that time, and the continual advance in the design and quality of the ordnance optical instruments would have been impossible without the co-operation and initiative of Mr. Saegmuller and the Bausch & Lomb Optical Company, whose entire resources were at all times available to the Bureau of Ordnance and its officers without restriction and without charge. Too great credit cannot be given Mr. Saegmuller for the part he has had in this development.

To Lieutenant Commander Mustin alone is due the original designs of our present turret telescopes and earlier broadside telescopes. While the general feature of design of these telescopes were not unknown to optical instrument makers, Mustin was the first to apply these features to gun-sighting telescopes and make

their use possible in our service. These telescopes were the result of Mustin's independent work and experiments in optical design, a field up to that time practically unknown to officers. When it is considered that the great advances in telescope construction from the old Mark VII and Mark X telescopes to the new telescopes, and from the old parallel-motion turret sight to the new turret trunnion sight are due to the thorough and conscientious work of this officer, the value of his services, resulting as they have in the increased efficiency of the fleet, cannot well be estimated.

It should be remembered that while many advances have been made since Mustin's original designs were introduced, the fundamental principles of design introduced by Mustin are embodied in all our telescopes and will always be a feature of any future design.

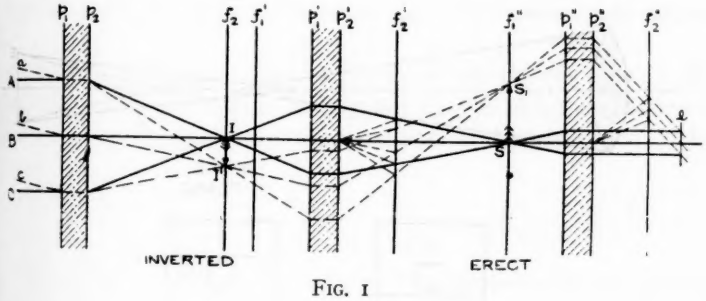


FIG. 1

SECTION II

ELEMENTARY TERRESTRIAL TELESCOPE

Expressed in the simplest terms, a terrestrial or erecting telescope (which is the type used for gunsighting) consists of an *objective lens,* which forms, at some point in rear of the lens, a real inverted image of the object viewed; an *erecting system,* which transforms the real inverted image into a real erect image; and a *magnifying eyepiece,* by means of which an enlarged virtual image is seen.

In Fig. 1 is shown a terrestrial telescope represented by the Gauss system of principal planes. (A full presentation of this very interesting method can be found in the Bureau of Ordnance pamphlet on elementary optics.)

Fig. 1 shows clearly the position of the inverted image at II' and the erect image at SS'. If the erect image is at the first focal plane of the eyepiece as shown, we have an elementary terrestrial telescope by means of which the eye sees an enlarged image in its proper position.

As previously stated, the erect image formed in rear of the erecting system is real and can be seen on a screen placed at the proper point. This image is, however, very small and it is necessary to magnify it by means of the eyepiece. The image actually seen by

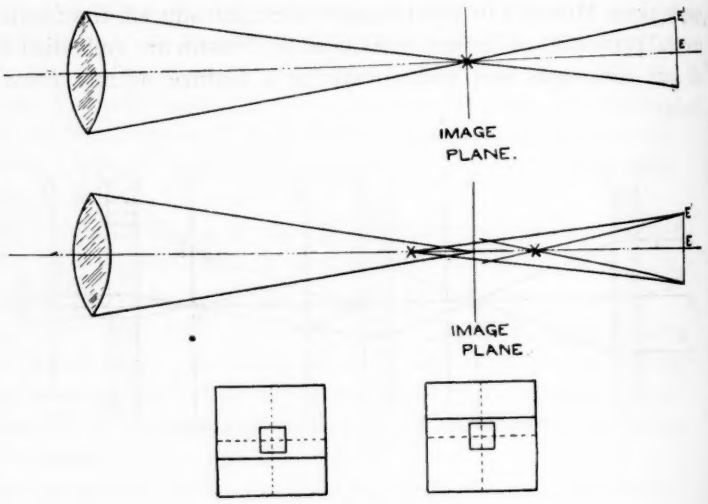


FIG. 2

the observer is a virtual image of the erect real image. This virtual image is projected out in front of the eyepiece at a distance approximately equal to the distance of the object itself.

When an object is viewed through a telescope the final virtual image appears much nearer than the object; but, as stated above, this is not the case, the final virtual image and the object occupying practically the same point. The apparent nearness of the image is an optical illusion, caused by the increase in detail due to the magnification.

All that is necessary to convert this telescope into a gun-sighting telescope is to place cross wires, or a cross line glass, either in the second focal plane of the objective lens, where the inverted image

II' is formed, or in the first focal plane of the eyepiece lens, where the erect image *SS'* is formed. The eye will then see image and cross lines in the same plane. If, however, the cross lines are not in the same plane as the image, there will be parallax of the cross lines, the cross lines apparently moving on the image as the eye is moved, as shown by Fig. 2.

PARALLAX

An examination of Fig. 2 shows that if the cross lines appear to move down on the image when the eye is moved up from the axis at *E* to the point *E'*, and vice versa, the cross lines are in rear of the image.

If, on the other hand, the cross lines appear to move up on the image when the eye is moved up from the axis, and vice versa, the cross lines are in front of the image. The remedy to be applied is obvious.

The reduction of parallax by placing inside the eye guard a disc with a central pin hole is simply due to the fact that the eye is mechanically kept close to the optical axis of the telescope.

SECTION III

FOCUSING CAPS

The use of focusing caps is directly connected with the question of parallax.

One of the simplest optical principles lies in the fact that parallel pencils of light from a distant object passing through a positive, or convergent, lens will be refracted and will form a real image at the focal plane of that lens.

Conversely, if we place an object in the focal plane of a positive lens, the rays of light coming from that object and passing through the lens will emerge in parallel lines as if the object was at an optically infinite distance.

All ordnance optical instruments are constructed on the telescopic principle, *i. e.*, that the pencils of light entering the objective lens will be parallel, and the cross lines are placed in the focal plane, either of the objective lens or of the eyepiece combination.

If the pencils of light proceed, not from a distant object, but from an object only a short distance away, such as a dotter target, the pencils will be divergent when they strike the objective lens

and the resultant image will be formed in rear of the cross lines, resulting in parallax.

Many of the telescopes have no adjustment for parallax. In other telescopes, while the cross lines may be moved with reference to the objective lens so as to place the cross lines in the new image plane, the telescope itself cannot be sharply focused on such an image and the pencils emerging from the eyepiece are not parallel and the eye is strained. A compromise has to be made between indistinct focus with no parallax and sharp focus with parallax.

A single lens could be used to project the dotter target to an infinite distance, but, as pointed out above, the dotter target would have to be placed in the focal plane of the lens, or a lens of different focal length would have to be used for each different dotter: either procedure would be impracticable.

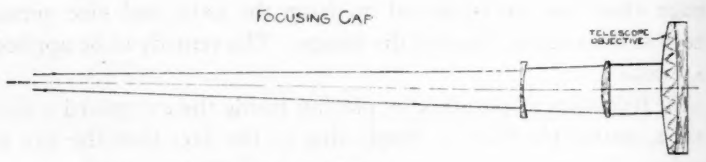


FIG. 3

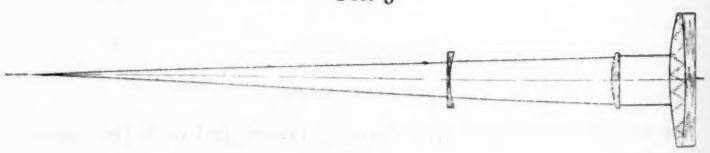


FIG. 4

The use of the focusing cap overcomes all these difficulties.

The focusing cap consists of a positive and a negative lens so mounted that the distance between them may be varied at will. Increasing the distance between the lenses decreases the equivalent focal length of the combination, and vice versa (Figs. 3 and 4), so that simply by moving the draw tube of the focusing cap in and out a dotter target at any distance may be brought into sharp focus, the telescope cross lines being free from parallax at the same time.

It would appear at first thought that the use of the focusing cap would reduce the field of the telescope, but this is not the case. An examination of Fig. 5 will show that while the use of the focus-

ing cap materially reduces the amount of light entering the objective lens, we still have parallel pencils from the center and from each extremity of the field falling upon that portion of the objective lens which is not stopped down by the focusing cap.

In using, the telescope should be focused and free from parallax on a distant object. The focusing cap is then shipped in place on the objective end of the telescope, the telescope directed toward the dotter target and the draw tube moved in and out until the target appears clear and distinct and the telescope cross lines are sharp and without parallax.

The adjustment of the focusing cap covers a wide range as it can be used with dotter targets whose distance from the telescope objective varies from a few inches to many feet.

It is not essential that the focusing cap be placed close to the objective lens of the telescope. Good results have been obtained with the focusing cap two feet distant from the objective lens,

FIG. 5

with a mirror between the focusing cap and the objective lens, but two requirements must be fulfilled in using focusing caps.

First. The focusing cap must be so rigidly attached to the telescope as to partake of every movement of the telescope.

Second. The space between the telescope objective lens and the focusing cap should be preferably completely enclosed so that no light strikes the telescope objective lens unless it passes through the lenses of the focusing cap. Owing to the fact that the interposition of the two lenses of the focusing cap between the object observed and the telescope objective lens cause a certain change in the line of sight, it is not advisable to use focusing caps while boresighting on battens for target practice, as the telescopes would point incorrectly after the focusing caps were removed.

Focusing caps can, however, be put to very effective use when battens are used for installing sights or for checking them. The use of focusing caps makes possible a very sharp focus and a complete elimination of parallax at any distance desired. While, as

pointed out above, the focusing cap causes a displacement in the line of sight, this displacement for any one focusing cap is always the same as long as the focusing cap is not moved.

At present parallax and indistinct focus on the sight adjusting battens are undoubtedly the cause of considerable trouble and uncertainty and very probably lead to serious error. By using focusing caps on all telescopes in connection with the new boresight telescope, accurate determination can be made of the parallelism of the lines of sight of pointers' and trainers' telescopes and of the axis of the bore of the guns themselves in turrets through the entire range from 0 to 20,000 yards.

In addition, accurate determination can be made of the true vertical and horizontal movement of any telescope through the entire range and azimuth adjustment.

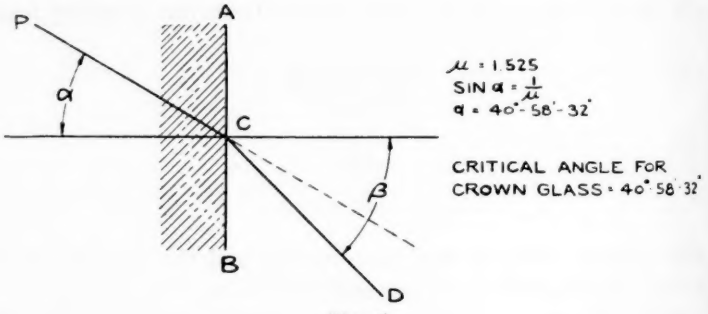


FIG. 6

SECTION IV

TOTAL REFLECTION IN PRISMS

The optical property of refraction, insofar as it relates to light passing from air into a denser medium, is so well known that it will not be discussed.

The case of light passing out of one medium into a medium *less dense* is of such extensive application in all prism instruments that its presentation here is considered essential.

Here the refracted ray is bent *away from the normal* and the ratio between α and β is less than unity. As α increases, a value is reached such that $\beta = 90°$ and the ray is refracted along the sur-

face separating the two media, in the direction of CB. This value of α is called the "critical angle" for that medium as any greater value of α will cause the ray to be totally reflected internally.[1]

This total reflection is the most perfect reflection that can be obtained, less than one per cent of the light being lost at the reflecting surface, and is extensively used in constructing optical instruments.

In Fig. 7 is shown a 90° prism.

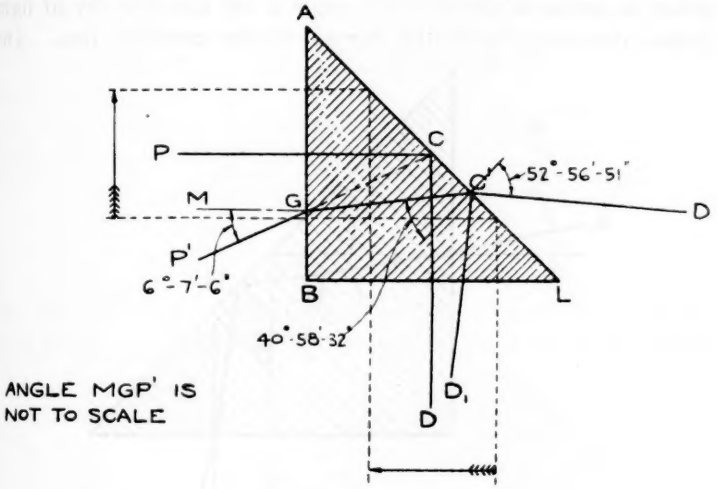


FIG. 7

A ray of light PC falling normally upon the face AB of the prism will be totally reflected from the inclined face AL and, if the prism angles are accurate, will emerge in a direction making an angle of 90° with the entering ray.

Fig. 7 shows that such a prism will invert (turn upside down) or will reverse (turn right for left), according to the position of the prism, an object reflected by it.

It also shows that the field of such a prism must be small; for a ray such as $P'G$ will be refracted at G in such a way as to strike

[1] In Fig. 6 we have the equation

$$\frac{\sin \alpha}{\sin \beta} = \mu'. \quad \text{When } \beta = 90°, \sin \beta = 1 \text{ and } \sin \alpha = \mu'.$$

If we assume $\mu = 1.525$ for prism crown glass then $\mu' = \frac{1}{\mu} = \sin \alpha = \frac{1}{1.525}$
$\alpha = 40° - 58' - 32''$ which is the critical angle for that kind of glass.

the reflecting face at an angle less than the critical angle, with the result that part of the light will be refracted through to D " and only part of the light will be reflected to D', causing a loss of light from the edges of the field. Calculation shows that for perfect reflection the angle that $P'G$ makes with the normal to the entering face cannot exceed 6° 7′ 6″, which gives an angle of field of the prism = 12° 14′ 12″.

Fig. 8 shows another disadvantage of the 90° prism. If the prism is displaced through any angle a, the entering ray of light makes that angle with the normal to the entering face. The

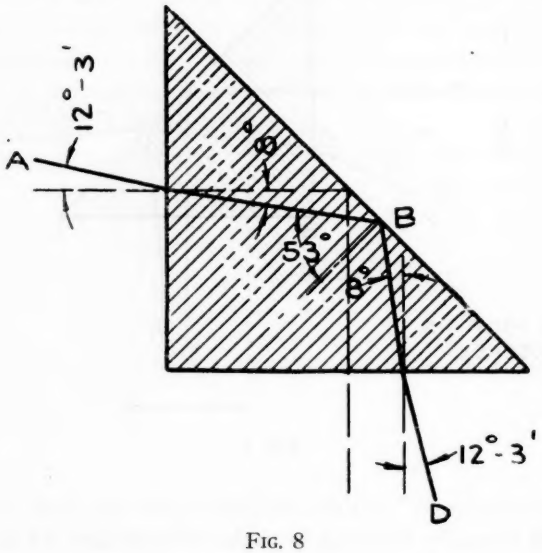


FIG. 8

emergent ray of light makes the same angle with the normal to the emergent face, but lies on the opposite side of the normal, and the angle between the entering and the emergent rays is $90° \pm 2a$, which doubles the error.

The disadvantages of the single-reflecting 90° prism are overcome by the use of double-reflecting prisms; the penta prism and the Porro prism are the best known types of the double reflecting prisms. The principle of double reflection is expressed by the statement that *if a ray of light is reflected by each of two plane surfaces, its deviation is equal to double the angle between the two reflecting surfaces.*

If the angle between the two reflecting faces is 45°, as in the penta prism, the deviation of the ray is 90°. If the angle between

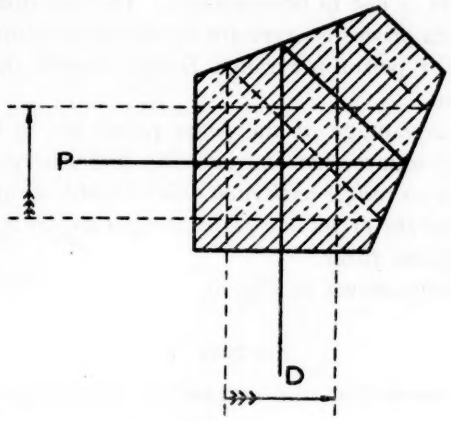


FIG. 9

the two reflecting faces is 90°, as in the Porro prism, the deviation of the ray is 180°. Figs. 9 and 10 show the penta prism.

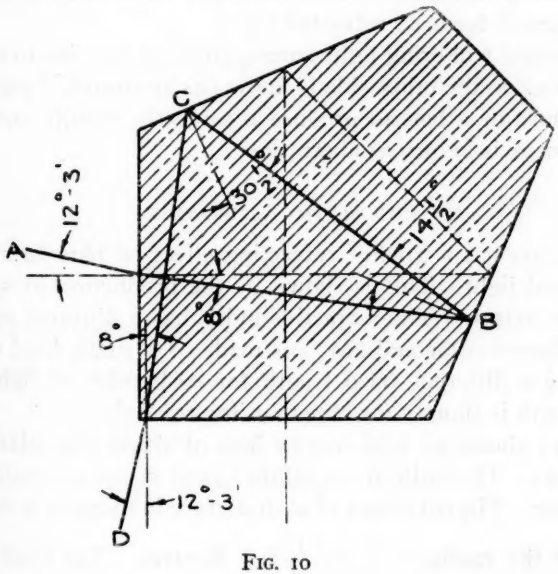


FIG. 10

These figures show that the reflected image is not reversed. As the ray of light strikes both reflecting faces at an angle less than

the critical angle it is necessary to silver the reflecting faces. The disadvantage of the penta prism compared to the 90° prism is that more light is lost in transmission. The one disadvantage in the use of penta prisms is overcome by the far-reaching advantage of this type of prism for range finders, where there are two optical systems.

The great advantage of the penta prism lies in the principle of the optical square that *the entering and emergent rays will always make a 90° angle with each other regardless of the angular displacement of the prism in a plane at right angles to the entering and the emergent faces.*

This is clearly shown in Fig. 10.

SECTION V

CHROMATIC AND SPHERICAL ABERRATION

Owing to the nature of refraction, there are two errors in refracting optical instruments that have to be corrected or minimized: one (chromatic aberration), due to the unequal refraction of light of different colors; the other (spherical aberration), due to the inexact focus of refracted rays.

A lens that will bring light from a point on one side to an exact point focus on the other side is known as accurately "stigmatic." Any failure of a lens to produce a perfectly definite and undistorted image is known as aberration.

CHROMATIC ABERRATION

Any glass has a greater refracting effect on blue light than it has on red light. This is shown by the production of spectrum colors by prisms. The refractive index has a different value for each different color and any lens made of a single kind of glass will have a different focal length for each color of light. The focal length is shorter for blue than for red light.

Fig. 11 shows an equi-convex lens of dense flint glass (Jena glass 041). The radii of curvature r_1 and r_2 are 200 millimeters, or .2 meter. The curvature of each surface in dioptres is the reciprocal of the radius $= \frac{1}{r} = \frac{1}{.2} = 5$ dioptres. The total surface curvature is $\frac{1}{r_1} + \frac{1}{r_2} = 10$ dioptres. The total surface curvature

multiplied by the refractivity gives the power in dioptres, which is the reciprocal of the focal length in meters.

The refractivity $=\mu-1$.

Reference to Table I of refractive indices on page 1447 will show that this dense flint glass has these values of μ:

Red light (A ray) 1.7030.

Yellow light (D ray) 1.7174.

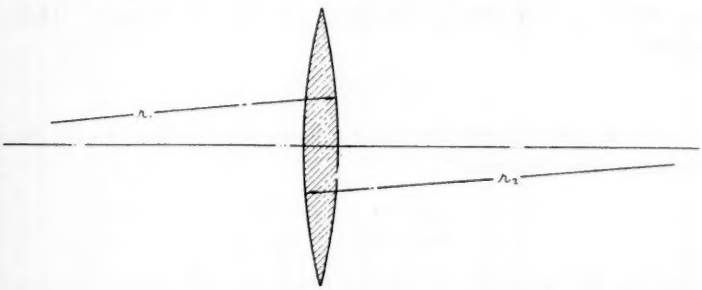
Blue light (G ray) 1.7501.

The corresponding refractivities ($\mu-1$) are:

Red light .7030.

Yellow light .7174.

Blue light .7501.



$A_1 = A_2 = 200$ m/m $= .2$ M

CURVATURE $= \frac{1}{2} = .5$ DIOPTRIES

TOTAL CURVATURE $= 1.0$ DIOPTRIES

	REFRACTIVE INDEX	REFRACTIVITY	POWERS	f
RED LIGHT (A) LINE	1.703	.703	7.03	$\frac{1}{7.03}$ M = 142.2 m/m
YELLOW LIGHT (D) LINE	1.7174	.7174	7.17	$\frac{1}{7.17}$ M = 139.4 m/m
BLUE LIGHT (G) LINE	1.7501	.7501	7.50	$\frac{1}{7.50}$ M = 133.3 m/m

FIG. 11

The corresponding powers $\left[(\mu-1)\left(\frac{1}{r_1}+\frac{1}{r_2}\right)\right]$ are:

Red light 7.03 dioptres.

Yellow light, 7.17 dioptres.

Blue light 7.50 dioptres.

The corresponding focal lengths $\left(f=\frac{1}{p}\right)$ are:

Red light $\frac{1}{7.03}$ $M = 142.2$ mm.

Yellow light $\frac{1}{7.17}$ $M = 139.4$ mm.

Blue light $\frac{1}{7.50} M = 133.3$ mm.

The focal point for blue light is 8.9 millimeters nearer the lens than for red light.

ACHROMATIC LENSES

The difference between the refractions of different colors is known as the dispersion.

In the table, the refractive index for mean light (yellow light of the sodium D line) is given in the column D or μ_D. There is also tabulated the medium dispersion (the difference between the refractive index μ_C for red light of the "C" line and the refractive index μ_F for blue green light of the "F" line). This is written

$$\mu_F - \mu_C \text{ or } \Delta_\mu$$

If the medium dispersion were always proportional to the mean refraction the fraction

$$\frac{\mu_D - 1}{\mu_F - \mu_C} \text{ or } \frac{\mu_D - 1}{\Delta_\mu}$$

would be the same for all optical glass and chromatic aberration could not be corrected.

An inspection of the last column of Table I shows that the value of this ratio varies greatly. This ratio is all important in lens calculation. It gives the amount of refraction for a given amount of dispersion and is usually denoted by the Greek letter ν. In the table for the lightest crown $\nu = 70$, while for the heaviest flint $\nu = 19.7$.

If we wish to combine two lenses so that each will neutralize the dispersion of the other, two conditions must be complied with.

First. The lenses must be of opposite kinds; one positive, the other negative.

Second. Their refracting powers must be so chosen that the lens of greater refracting power will cause exactly as much dispersion as the lens of less refracting power.

The second condition is met by making the respective power of each lens proportional to its value of ν.

For example, in the case of the hard silicate crown glass (O374 Table I) with a value of $\nu = 60.5$ and the dense silicate flint (O41

TABLE I. REFRACTIVE INDICES
JENA GLASS (SELECTED SORTS ARRANGED IN ORDER OF REFRACTIVITY FOR EQUAL MEAN DISPERSION)

TABLE I. REFRACTIVE INDICES

JENA GLASS (SELECTED SORTS ARRANGED IN ORDER OF REFRACTIVITY FOR EQUAL MEAN DISPERSION)

Factory numbers	Description	Density	Refractive index for D	Partial dispersion			Medium dispersion C to F	$\nu = \frac{\mu_D - 1}{\Delta\mu}$
				A′ to D	D to F	F to G′		
O 225	Light phosphate crown.....	2.58	1.5159	0.00485	0.00515	0.00407	0.00737	70.0
O 374	Silicate crown.....	2.48	1.5109	0.00547	0.00593	0.00479	0.00844	60.5
O 60	Calcium silicate crown.....	2.49	1.5179	0.00553	0.00605	0.00487	0.00860	60.2
O 203	Ordinary silicate crown.....	2.54	1.5175	0.00563	0.00616	0.00499	0.00877	59.0
O 598	Silicate crown.....	2.59	1.5152	0.00562	0.00619	0.00499	0.00879	58.6
O 164	Boro-silicate flint.....	2.81	1.5503	0.00710	0.00786	0.00644	0.01114	49.4
O 41	Dense silicate flint.....	4.49	1.7174	0.01439	0.01749	0.01521	0.02434	29.5
S 57	Densest silicate flint	6.33	1.9626	0.02767	0.03547	0.03252	0.04882	19.7

C, red; D, yellow; F, blue green.

D (μ_D), refractive index for D line (yellow).

μ_C, refractive index for C line (red).

μ_F, refractive index for F line (blue green).

$\mu_F - \mu_C = \Delta\mu =$ medium dispersion.

$\mu_D - 1 =$ mean refraction.

$\frac{\mu_D - 1}{\mu_F - \mu_C} = \frac{\mu_D - 1}{\Delta\mu} = \nu =$ amount of refraction for a given amount of dispersion.

Table I) with a value of $\nu = 29.5$, the crown glass produces very nearly double the amount of refraction for the same dispersion as the flint.

If we select a convexo-plane (positive) crown lens of +6.05 dioptres and a plano-concave (negative) lens of −2.95 dioptres (which are respectively proportional to their values of ν) they will have equal and opposite dispersions and the refractive power or ability of the lens will be the algebraic sum of the two powers selected, $+6.05 - 2.95 = +3.10$ dioptres.

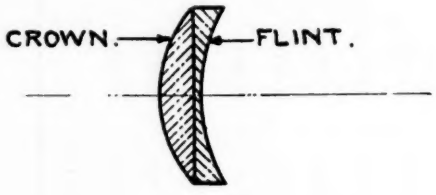


FIG. 12

The two lenses cemented together, as in Fig. 12, will give an achromatic lens of a power of +3.10 dioptries.

For a negative achromatic lense the powers would have to be −6.05 and +2.95 dioptres.

While this combination is achromatic, it is not a satisfactory lens, as it produces spherical aberration and distortion of field.

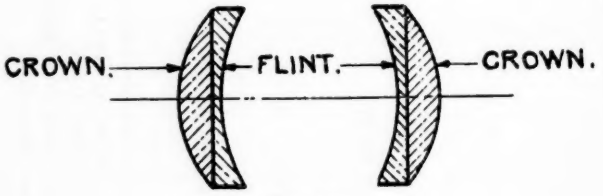


FIG. 13

Two of these lenses placed as in Fig. 13 will give an excellent lens free from chromatic and spherical aberration and with very little distortion of field.

Satisfactory objectives and other lenses vary widely in form and curvature, depending upon their use. Figs. 14 and 15 show two very satisfactory objectives.

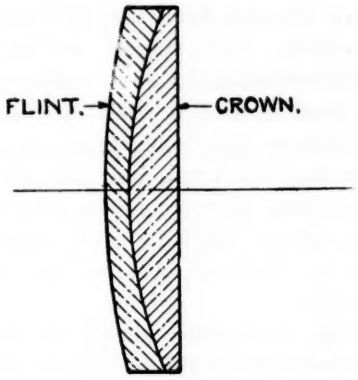


FIG. 14

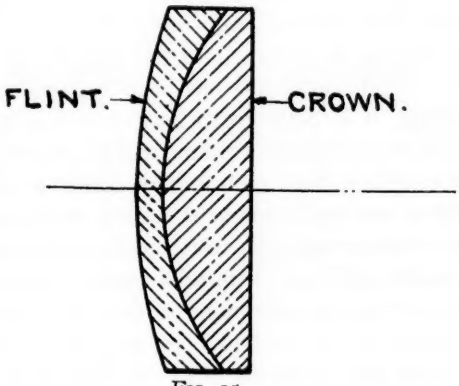


FIG. 15

SECONDARY SPECTRUM

In the above calculation for an achromatic lens we have taken the medium dispersion between the red (C) line and the blue-green (F) line of the spectrum. The lens is corrected for these two colors, which are exactly focused at the same point; but there are other parts of the spectrum which are not brought accurately to the same focus as the two colors for which correction has been made. The uncorrected rays are those of intermediate wave length (yellow and green) and those of shorter wave length (blue, violet and ultra violet).

The residual chromatic aberration is called the secondary spectrum.

Lack of space prevents discussing the means of correcting the secondary spectrum. This subject is fully dealt with in the Bureau of Ordnance pamphlet on elementary optics.

There have been developed lately several glasses that, when corrected for primary color abberration, are also practically free from the secondary spectrum, but, like all exceptional optical glasses, this freedom from secondary color seems to have been attained by a sacrifice of other desirable qualities, as some of these special glasses are relatively unstable and easily affected by atmospheric moisture.

For this reason, while these glasses are undoubtedly of value for certain purposes, it would be a fatal error to use them for ordnance optical instruments.

It has been reported that the optics of the telescopes for certain foreign battleships became badly spotted after a short time in service and had to be returned to the makers for correction in this respect. While no report has been received as to the cause of this spotting, it is believed to be due to the use of unstable glass, probably in an endeavor by the makers to prevent secondary color. The only way that such a fault could be remedied would be by supplying new optics made of a more stable glass.

Up to the present time, the telescopes used in the U. S. Navy have been remarkably free from such faults. In an experience of some years, covering the personal examination of several thousand telescopes, many of which had been in service for months and years, the writer has found but one case, that of an objective lens, where the optics of a telescope were noticeably spotted by the action of atmospheric agents. The condition of the other parts of the telescope in question, including the objective lens retaining ring, showed that the telescope had been exposed to the weather for a considerable period of time.

SECTION VI

SPHERICAL ABERRATION

If we were dealing with monochromatic light and had thus overcome the difficulty of light of different colors being brought to a focus at different points, we would find that even a lens ground to perfect sphericity of figure would not give a perfectly focused image. All the rays would not come to a point. The rays

passing through the margin of the lens would come to a focus nearer the lens than those passing through the center. Fig. 16 shows, exaggerated, parallel light passing through a plano-convex lens. The marginal rays focus at *J*, the central rays at *F*.

At some point between *J* and *F*, the rays form the narrowest bundle. The resulting small round spot is called the circle of least confusion and is the nearest approach to a point focus.

The spherical aberration might be reduced by the use of a dia-

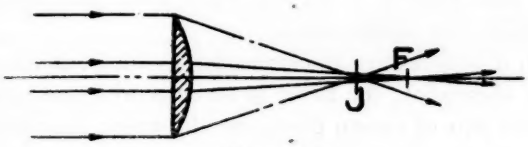


FIG. 16

phragm cutting off the marginal rays, but this method would result in loss of light. The marginal zone refracts the light too much. If the curvature of the marginal zone is flattened by grinding, a correction can be made for the aberration inseparable from sphericity of figure. This method is followed in the case of objective lenses for large telescopes. When passing through a surface, the greater angle that the ray makes with the normal to that surface, the greater will be the refraction and the spherical aberra-

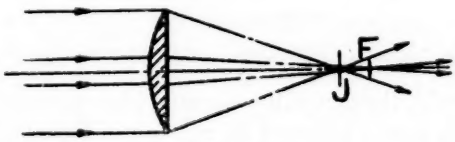


FIG. 17

tion of that ray. The more the ray passes through normally to the surface, the less will be the aberration. To insure the minimum aberration it becomes necessary to divide the refraction about evenly at the two surfaces of the lens. In other words, the angles of incidence and emergence must be equal or nearly so. As shown in Fig. 17, turning the plano-convex lens around so that the curved face will be presented to the light will lessen the aberration considerably.

Of all lenses of equal "power" that could be used to carry parallel light to or from a focus, the best form is a bi-convex lens having the curvature of the faces in the ratio of 1 to 6, the flatter face being toward the focus. A lens having such a form is known as a crossed lens (Fig. 18).

The amount of longitudinal spherical aberration of a crossed lens is only 3/14 as great as that of an equi-convex lens of the same focal length and aperture.

The spherical aberration of a crossed lens is, however, very little less than that of a convexo-plane lens; as a consequence, crossed lenses are seldom used.

Though it is necessary to correct lenses for both spherical and chromatic aberration, the latter is much more important. In an equi-convex lens of crown glass, the chromatic aberration is sixteen times as large as the spherical aberration. In an equi-convex

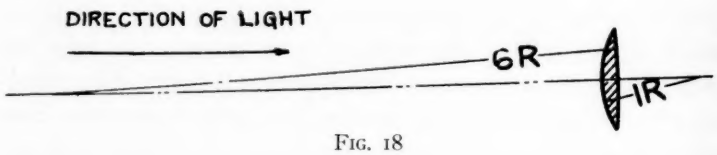


FIG. 18

lens of flint glass, the chromatic aberration is twenty-seven times as large as the spherical aberration.

SECTION VII

THE DESIGN OF TELESCOPES FOR NIGHT USE

Until recently, the generally accepted idea was that any increase of magnifying power lessened the amount of light passing through the telescope, making the object observed darker and less distinct, and therefore, for efficient night use, a telescope must have a low magnification (not more than 3 or 4 diameters). This belief was on account of the poor results obtained at night with the earlier telescopes and binoculars of high magnification. The poor results were due, not to the high magnification, but to the fact that the designers had neglected the simplest optical principles essential to an efficient night telescope.

If we disregard all other considerations, and our telescope is correctly designed, so that the aperture of the objective lens is

sufficiently large, it is an axiom that night efficiency increases with magnification; for the reason that a distant target, which, when viewed through a low magnification telescope, appears either as a shapeless luminous spot in a dark field, or as a shapeless dark spot in a luminous field; will, when viewed through a high magnification telescope, appear larger and will take on form and detail, permitting more accurate pointing. Small objects, invisible with a low magnification, are distinctly seen with a high magnification.

When we observe an object having a fixed intensity of illumination, its apparent brightness depends upon the angular dimensions of the pencils of light that, proceeding from every point of the object, enter the eye and are brought to a focus on the retina.

Unless the object is very close, its distance will not affect the angular dimensions of the pencils of light inside the eye. The angular dimensions of these pencils depend solely on the diameter of the pupil or aperture of the eye if this aperture is unobstructed.

Consequently, when viewed by the unaided eye, the apparent brightness of an object having a fixed intensity of illumination is dependent only on the size of the pupil of the eye. It is well known that the pupil of the eye is dilated at night to a diameter considerably larger than it is in the day time. This is the involuntary effort of the eye to increase the apparent brightness of dimly illuminated objects.

It is clear that a night glass of any form should not fail to utilize the whole area of the dilated eye pupil. It is evident that no optical instrument can increase the brightness of the object, for no arrangement can increase the dilation of the eye pupil, but if the pencils in passing through the instrument are, at the point of entrance to the eye, cut down to a diameter less than the diameter of the eye pupil, a portion of the eye pupil is not utilized. In such a case, the object appears less bright than if viewed by the unaided eye.

When a telescope is well focused for other than near-sighted eyes, the emergent pencils are practically parallel and have a diameter which is dependent on a certain relation between the magnifying power and the aperture of the objective lens. At the eye point, where the eye must be placed in order to take in the full field, there is formed an image of the aperture. This image is called the exit pupil and it has a diameter about equal to the diameter of the emergent pencils. This is illustrated by the following

figure, where E is the eye point and e is the diameter of the exit pupil.

As there seemed to be no agreement of optical authorities on the size of the dilated eye pupil in a very dim light, a series of independent tests were made by different observers to determine this vital point.

A number of thin opaque discs large enough to completely screen the eye were each pierced with a round hole of a known diameter. The diameter of the smallest hole was .1", the next .12", the next .14", up to .26", the largest. A small dimly illuminated target was set up at one end of a dark building. The discs were mixed up, the observers stood at a distance from the target and viewed it alternately with the unobstructed eye and through

$$M = \frac{\varphi}{\theta} = \frac{A}{e} = 4$$

$\varphi = 40°$

$\theta = 10°$

$e = .25$

FIG. 19

the holes in the discs. The discs that caused the target to appear dimmer than when viewed with the unaided eye were separated from those that had no dimming effect. It was found that each observer, in laying aside all discs having a dimming effect, had selected all the discs having holes smaller than .2", and in laying aside all discs having no dimming effect, had selected all discs having holes .2", or greater.

Consequently, the dilated eye pupil in a very dim light was taken as .2".

It was thus determined that,

The first essential point for the design of an efficient night telescope is that the pencils of light, after passing through the telescope, must have a diameter of not less than .2" at the point where they enter the eye.

This is called the " exit pupil."

The exit pupil may be seen by holding the telescope at some distance from the eye and directing it toward the light. A bright spot will be seen in the center of the eye lens. This is the exit pupil and shows the size of the pencils of rays which the system of lenses and stops passes through to the eye. The exit pupil may be measured by placing a scale in rear of the eye lens at the point where a sharply defined round spot is formed. It may also be obtained by the equation

$$e = \frac{A}{M}$$

where e is the diameter of the exit pupil.

A the clear aperture of the objective lens.

M the magnification.

This equation shows that, with a fixed aperture of the objective lens, an increase of magnification decreases the exit pupil. In a variable power telescope we must use, at night, a magnifying power that will give an exit pupil of at least .2″ diameter.

When a variable power telescope is set to the magnification that gives an exit pupil of the same size as the pupillary opening of the eye it is said to have *normal magnification* (this term must not be confused with "unit magnification"). If the telescope is adjusted above the normal magnification, the apparent brightness of the target is decreased in the ratio $\frac{m^2}{M^2}$ where m is the normal magnification and M is the new magnification. An adjustment below the normal magnification gives an exit pupil larger than the pupillary opening of the eye without decreasing the apparent brightness of the target.

There is a certain percentage of light lost at each entering and emergent face of a lens or a prism and a small amount lost in passing through the lens or prism; but in a well designed telescope with good optics, this loss cannot be reduced beyond a certain minimum. If the exit pupil is sufficiently large, the apparent brightness of a target is not decreased by increase of magnification; but, as pointed out above, its apparent linear magnitude is increased and the night efficiency increases with increase of magnification. Unfortunately, the field of a telescope decreases with increase of magnification, so that our limit of magnification is soon reached because of the resulting small field.

The magnification of an object seen through a telescope is evi-

dently the ratio between the angle subtended at the eye by the final virtual image and by the object itself when seen by the unaided eye.

The ratio of magnification and field is expressed by the simple formula

$$\theta = \frac{\phi}{M}$$

where θ is the field of the telescope.

ϕ is the field of the eyepiece.

M is the magnification.

Referring to Fig. 19 it would seem that all that would be required to enlarge the field of the telescope would be to enlarge the eyepiece; but in practice, the eyepiece is limited by spherical aberration to such a diameter that the angle ϕ is not greater than 40°. In practice, the angle ϕ is generally about 35° or 36°. A stop or diaphragm is usually fitted in the plane of the erect image of such an opening that it cuts off all rays outside these angular limits.

As a telescope field of at least 4° is demanded by service conditions, the magnification, consequently, cannot exceed 8 or 9 diameters.

The objective lens is usually made larger than necessary because it is more or less imperfect near the edge. The lens is partially covered or stopped down until the clear aperture is of the proper diameter to admit the light desired and to limit the field to prevent spherical aberration.

The following table gives the optical characteristics of the old Mark X telescope:

		$e = \frac{A}{M}$		
M	A	e	ϕ	θ
8	.85″	.1″	36°	4° 30′
4.25	.85″	.2″	36°	8° 28′

It will be noted, that with this telescope, the highest magnification that could be used efficiently at night is 4¼ diameters. With the magnification of 8, the diameter of the pencils of light passing through the telescope and entering the eye is one-half the diameter of the pupillary opening and this telescope at a magnification of 8 would cut off 75% of the light that the eye could use at night.

This is shown by Fig. 20, where the outer circle is the pupillary opening, the inner circle the exit pupil; and the shaded area the amount of light cut off from the eye.

Where the exit pupil is of the same size as the pupillary opening, care is required in positioning the eye; for if the eye pupil overlaps the exit pupil, a loss of light results. For this reason, whenever possible, the exit pupil of all telescopes should be made slightly larger than the pupillary opening.

The best sight for night use is the one that can be used in the dimmest light. The efficiency of a night sight is thus inversely proportional to the intensity of illumination per unit of area required on the target or (when the target appears in silhouette) in the field. A very exact comparison of the value of any two telescopes for night use may be made by obtaining the relative intensities of illumination required for picking up the target.

A comparative test was made to obtain the relative night efficiencies of three telescopes submitted for test. A target was selected of a size to represent a destroyer bows on at 4000 yards

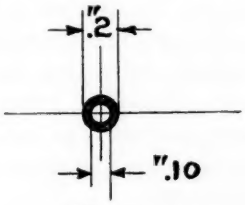


FIG. 20

and the intensity of illumination varied by moving a shaded light away from or toward the target. (The intensity of illumination varies inversely as the square of the distance of the source of light.) In each case, the illumination was just sufficient to pick up the target. The results were as follows:

Telescope	Magnifying power	Intensity of illumination	Night efficiency
A	8	1	1
B	4	3	$\frac{1}{3}$
C	$3\frac{1}{2}$	4	$\frac{1}{4}$

The exit pupils of all these telescopes were sufficiently large, the night efficiency being apparently proportional to the magnification.

With the illumination so that the target appeared only as a dim, indistinct blur to the naked eye, it was clearly defined when viewed through telescope *A*, and would have made an excellent target. Through telescope *C* with $3\frac{1}{2}$ magnification, the target appeared small and indistinct. When the magnification of the telescope *C*

was increased to 8, the target could not be seen, showing the effect of the decrease of the exit pupil.

If a telescope is designed for night use in accordance with the principles above, the target can be picked up when there is so little illumination that the cross lines are not visible. Some form of cross line illumination is therefore necessary.

When a target is not illuminated, but is visible because of light in the field, it appears as a silhouette and the cross lines require only a faint illumination. When the field is dark and the target is illuminated, the cross lines require stronger illumination. That is, the intensity of illumination per unit of area of the cross lines must considerably exceed the unit intensity of illumination of the target, otherwise that part of the cross lines lying across the target will be invisible.

Any light between the target and the eye affects the apparent brightness of the target; this is clearly shown by pointing any telescope provided with cross-line illumination at a dimly illuminated target and gradually increasing the intensity of the cross-line illumination; as the cross lines grow brighter the target apparently grows dimmer and finally is lost.

It is apparent that cross-line illumination is of vital importance in connection with night use.

To obtain the best results at night, it is necessary to have the telescope clean and well focused. The eyes of the pointer and trainer should be completely shielded from all light except that from the target and the cross lines. The rubber eye guard protects the eye in use; the other eye should be protected as well. Closing the unused eye is not a sufficient protection, as the eye lid is not opaque, and, in addition, the strain of keeping one eye closed is tiring and injurious.

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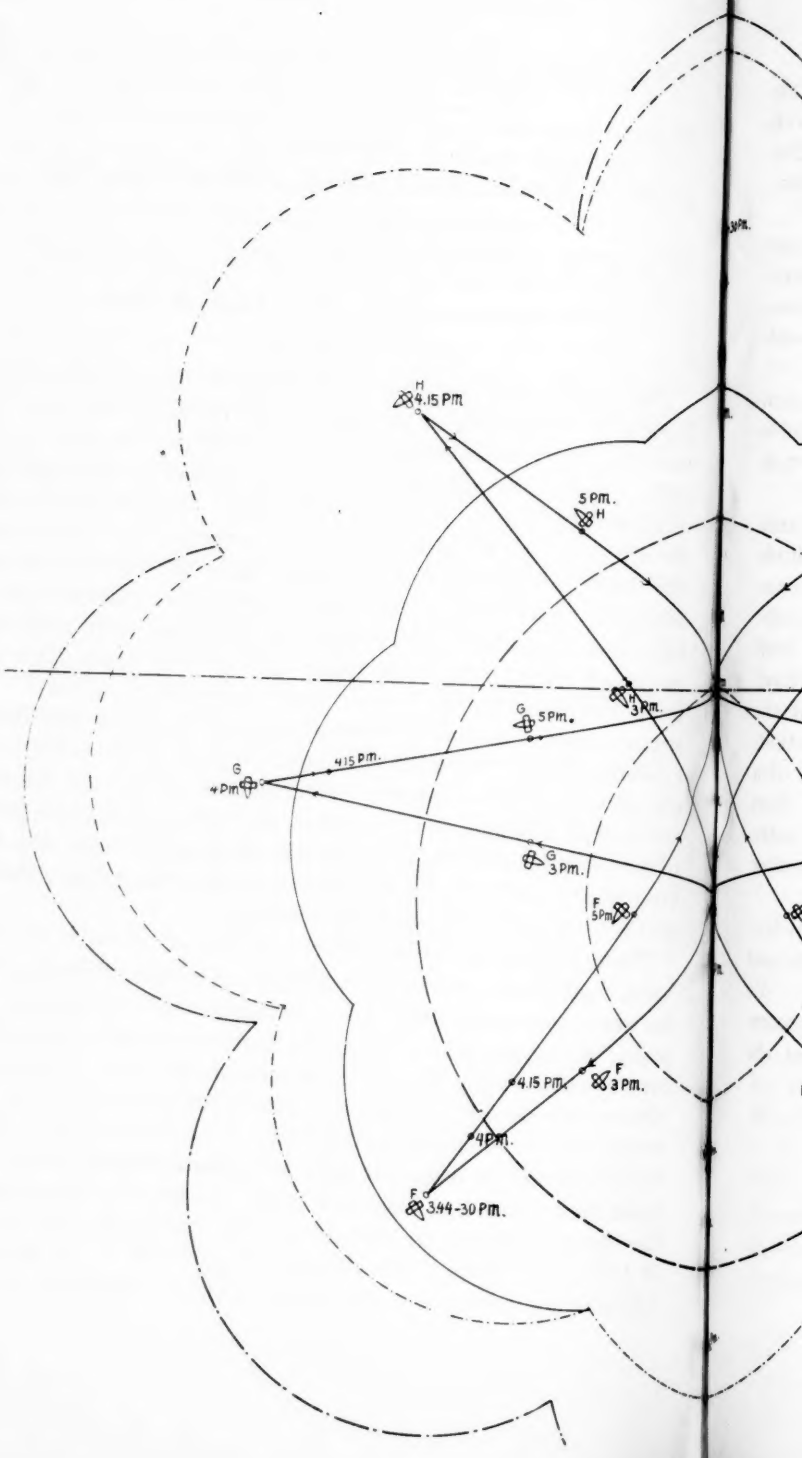
U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL AVIATION: ITS VALUE AND NEEDS

By LIEUTENANT R. C. SAUFLEY, U. S. Navy

The subject under discussion is no longer to be treated as a mere hypothesis. The flying of heavier than air machines over land and water has been demonstrated to be not only possible, but practicable. Aviation, though still fraught with dangers, is no longer the occult science that for years baffled Langley, Dumont and Wright, nor is it merely an aerial acrobatic feat performed for exploitation. The theory of aerodynamics is now within the layman's grasp; aeroplane construction is becoming a familiar occupation; and the high development of gas engines is allowing such additional weight of material that the factor of safety is appreciable and flying machines are no longer mere man-killing devices. The stresses, sudden and violent, brought upon the flying machine in exhibition flights nowadays demonstrate both their strength and efficiency, and the wonderful performances of Pegoud, Beachey and Garros, although of no practical value *per se*, are ample proofs of the possibilities of the aeroplane in the hands of men who have taken the hazards of learning how. Aviation has taken a definite status as an element of maritime warfare.

Those who doubt the possibilities of the aeroplane in war have based their views upon what might be called the performance of the aeroplane rather than upon its adaptability to martial purposes. How greatly such views are in error may be estimated by a cursory glance upon the performances of last year. The attainment to altitudes of 7000 feet is a daily occurrence: not a few have reached 18,000 feet, the record being over 20,000 feet. Speeds between 80 and 90 miles per hour are quite common, coming well inside the record—124 miles per hour. As many as 17 occupants have been carried to an altitude of 2000 feet, while the carrying of 5 to 7 occupants to an altitude of 3500 feet for a period of 1 hour is becoming more and more common. Aeroplane engines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4.15 PM
5 PM.
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5 PM
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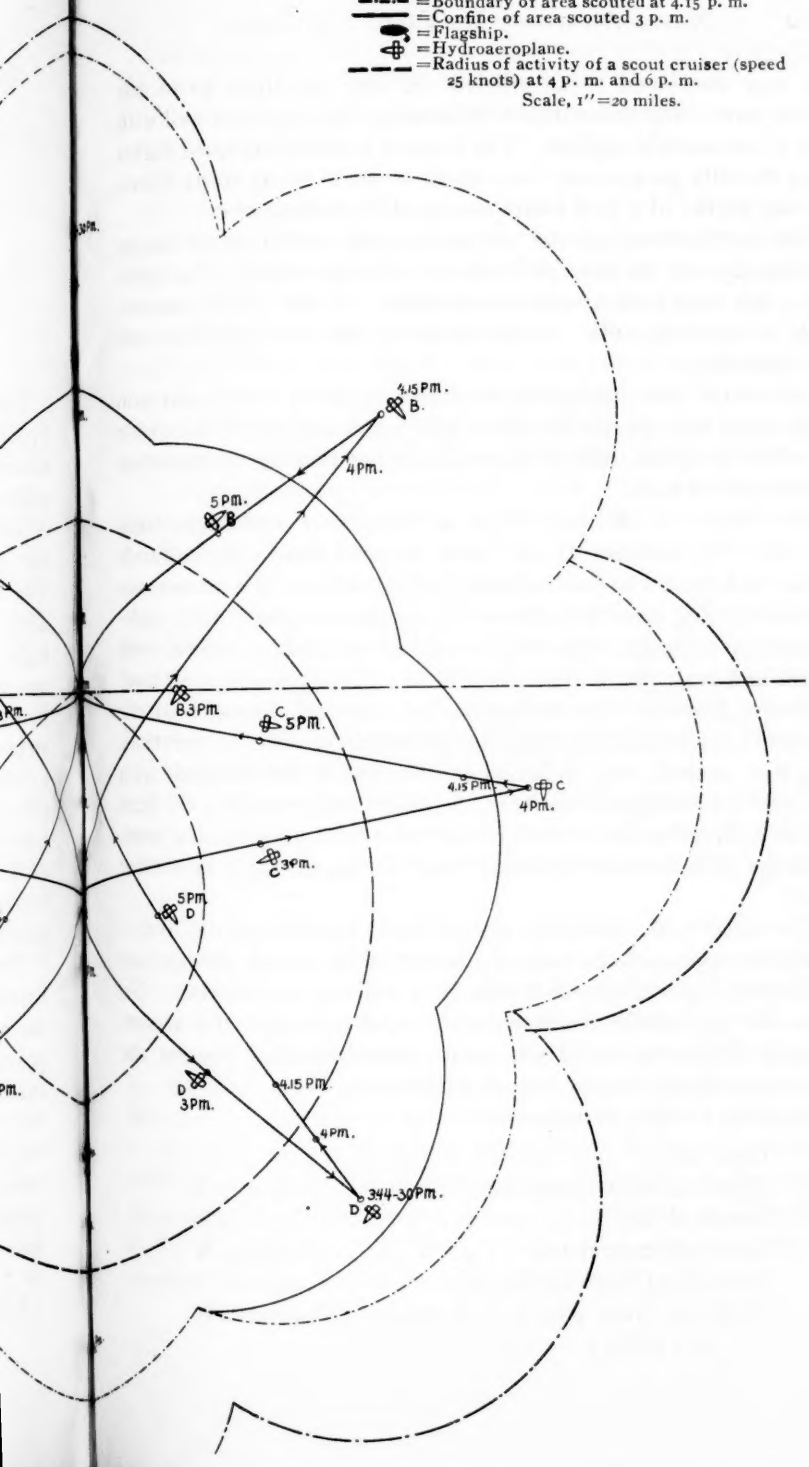
F
3 PM.
4 PM.
F
3.44-30 PM.

Diagram I

=Confine of scouted area.
=Boundary of area scouted at 4.15 p. m.
=Confine of area scouted 3 p. m.
=Flagship.
=Hydroaeroplane.
=Radius of activity of a scout cruiser (speed 25 knots) at 4 p. m. and 6 p. m.

Scale, 1″=20 miles.



are now developed to an efficient delivery of from 40 to 200 horsepower—and this with an endurance that compares well with that of automobile engines. The records for uninterrupted flights have recently progressed from 10 to 16 to 18 to 21 to 24 hours, leaving flights of 5 to 8 hours among the commonplace.

The performance of the aeroplane being therefore no longer an assumption, the next point is that of adaptability. The aeroplane has been both armed and armored. It can mount successfully a rapid-fire rifle. Bomb dropping has been effected with fair precision.

Given then that the hydroaeroplane can attain to and maintain high speed and altitude for 6 or more hours and that it is capable of offensive action, this machine cannot but become an important instrument of war.

The effects of offensive action on the part of hydroaeroplanes are real. The momentum of a bomb dropped from a high altitude is too well known to be discussed, but the effects of a continuous bomb-dropping from a squadron of aeroplanes upon a fleet, undefended by a similar squadron, would be of such a nature, both moral and real, that a discussion of the subject might well have extensive bounds. An analogous, yet stronger, instance of the offensive power of the hydroaeroplane would be seen in operations of a fleet against coast defenses or of a fleet in the blockade of a city and the contiguous shore. The observation work on the part of the hydroaeroplane would be unlimited and its offensive work from the altitudes now attainable could be opposed only by similar craft.

For naval work, however, the principal function of the hydroaeroplane appears to be that of a scout. With speed, altitude and endurance, such ability can only be a natural consequence. To illustrate that ability, both defensive and offensive, the accompanying diagrams are given, since graphically they present the case more clearly than a long description.

Diagram I. The premises are:

Clear air.
Speed of hydroaeroplane .....80 m. p. h.
Speed of fleet .....15 k. p. h.
Speed of scout cruiser .....25 k. p. h.
Altitude of hydroaeroplane .....4000 ft.
Visibility from 4000 ft.=70 miles. (Theoretically, 72.5 miles.)

The plotted position of the flagship represents the position of the fleet at 2, 3, 4, 5 and 6 p. m., respectively.

Position of hydroaeroplane plotted at times indicated.

Nightfall at 6 p. m.

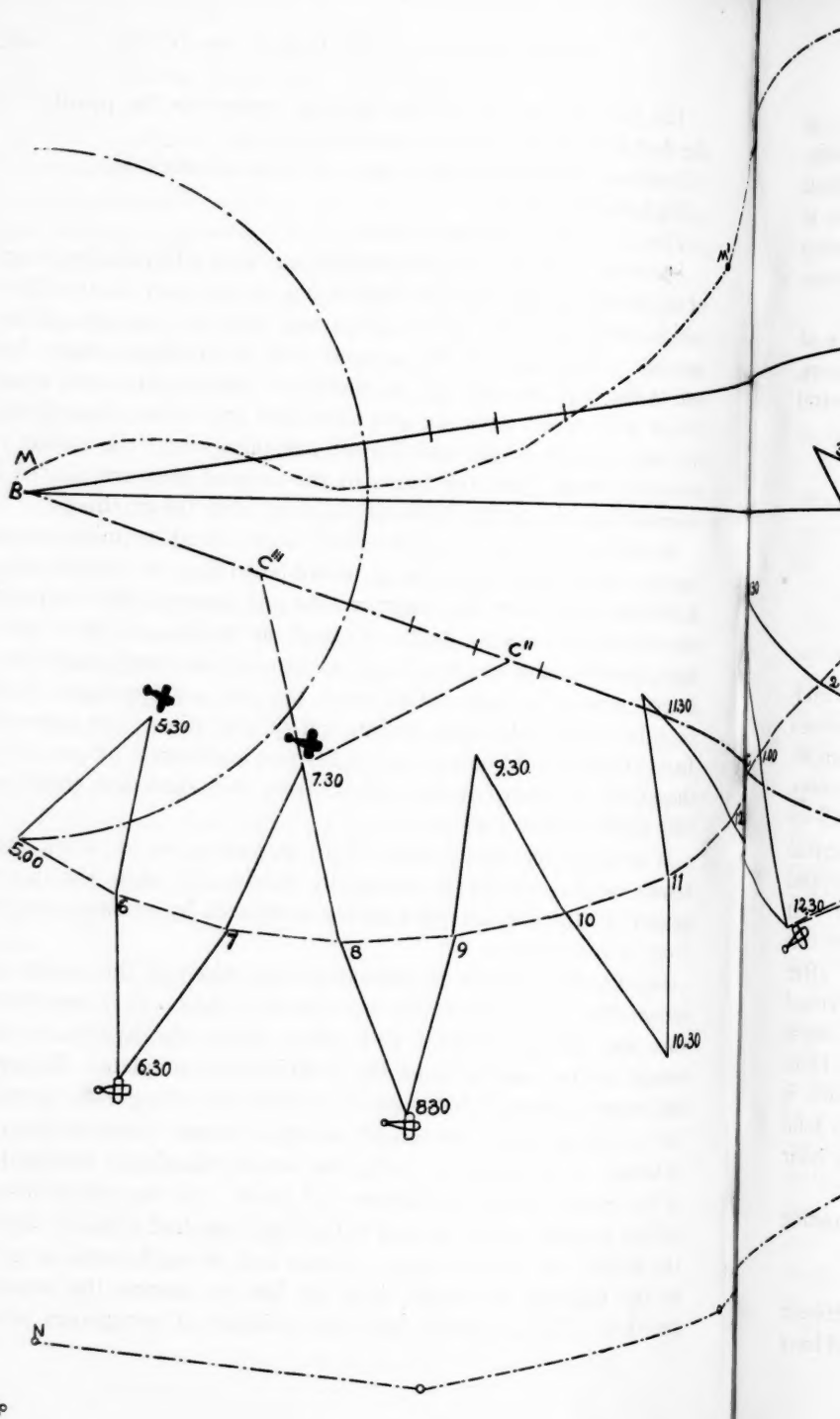
Fleet is without scout cruisers.

In order to make a reconnaissance and have all hydros on board at nightfall, assume that the fleet at 2 p. m. put over six machines, which scouted at the given speed and altitude over the plotted courses. The limit of the scouted area is an ellipse whose foci are at the 2 p. m. and 6 p. m. positions, respectively; and whose major and minor axes are 460 miles and 453 miles, respectively; but on account of the number of aeroplanes and the radius of visibility from them, the limits of the scouted area are plotted in intersecting arcs of the circle of visibility from the machines.

Assuming that there was an enemy scout ahead steaming toward the fleet, their rate of approach would be 40 m. p. h. In this event it will be seen from the diagram that any enemy undiscovered in the reconnaissance of hydro *A* could not make a surprise attack upon the fleet sooner than 11 p. m. An undiscovered attack from astern would be impossible, since the rate of approach would be only 10 m. p. h., over an interval of 260 miles. An approach from abeam would be at 25 m. p. h., over an interval of 220 miles: therefore an undiscovered attack from this direction could not take place before 2.48 a. m.

It is thus seen that danger from an *undiscovered* attack from astern or the quarter is practically eliminated, while the danger period of attack from other points is reduced by amounts varying from 5 to 10 hours.

In this diagram no consideration was taken of the scouts and screen that would ordinarily accompany a fleet. It is seen therefore that in conjunction with those latter, the hydroaeroplane would be the unit to make the combination complete. To equip the scout cruiser with aeroplanes would not only greatly increase her scouting zone, but would afford a minute scrutiny thereof. Whether in offensive or defensive action, the fleet's information of the enemy would be definite and quick. At the crucial instant before joining battle, in fact before the fleet had actually sighted the enemy, the latter's speed, course and strength could be given to the flagship in ample time for her to assume the superior position. To a normal fleet the addition of aeroplanes would


M
B
C'''
C''
5.30
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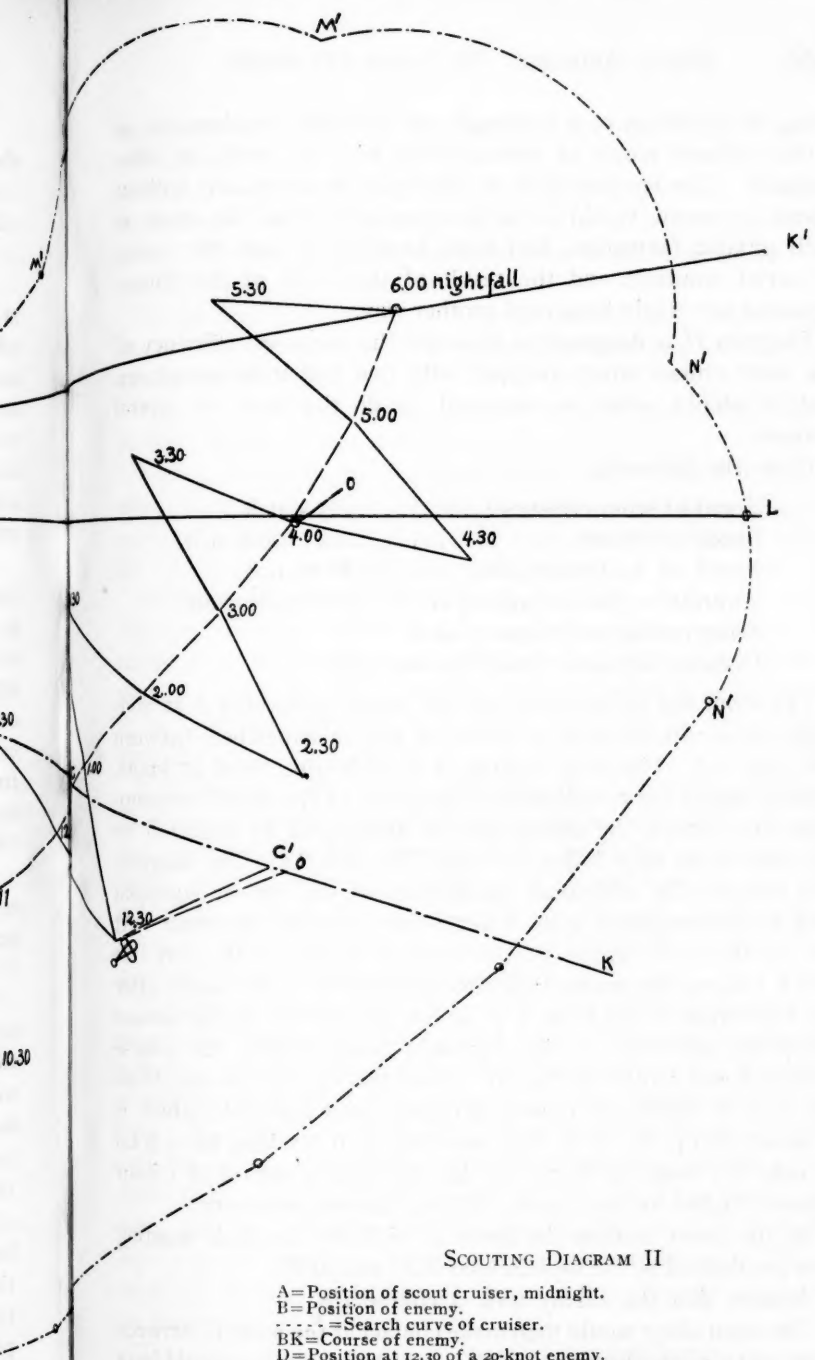

SCOUTING DIAGRAM II

A = Position of scout cruiser, midnight.
B = Position of enemy.
- - - - - = Search curve of cruiser.
BK = Course of enemy.
D = Position at 12.30 of a 20-knot enemy.
Assume: Enemy leaves B midnight, speed 15 knots.
∴ Cruiser intercepts enemy at C; aeroplane, at C''.
Assume: Enemy left 4 hrs. early;
∴ Aeroplane discovers at C'.
Assume: Enemy left 4 hrs. late;
∴ Aeroplane discovers at C'''.
} Scouted area = MM'N'N.

bring its operation to a thorough and detailed completeness; to a fleet without scouts or screens, such addition would be indispensable. The Russian fleet at Tsushima, unfortunately without scouts or screen, would never have emerged from the straits in such pitiable formation, had there been, as is now, the means of aerial scouting, and the result of the crisis of the Russo-Japanese war might have read another way.

Diagram II is designed to illustrate the increased efficiency of the scout cruiser when equipped with two fast hydroaeroplanes, and its ability, when so equipped, to do the work of several cruisers.

Given the following:

Speed of scout cruisers .....25 k. p. h.
Speed of enemy .....12 to 20 k. p. h.
Speed of hydroaeroplane .....80 m. p. h.
Altitude to give a visibility of 60 miles in clear air.
Scout cruiser at *A*, enemy at *B*.
Distance between *A* and *B* = 200 miles.

The scout has information that the enemy is leaving *B* at midnight, approximate speed 15 knots, on course somewhere between *BK'* and *BA*. The scout leaving *A* at midnight, speed 25 knots, follows search curve indicated in diagram. If the scout's assumptions are correct, the enemy will be intercepted by nightfall on any course she may follow between *BK'* and *BA*. The diagram will indicate the additional possibilities of the cruiser equipped with hydroaeroplanes, even if her assumptions are incorrect. At 5 a. m. the scout cruiser puts over an aeroplane on the port side which follows the course indicated and returns to the scout after the expiration of one hour, *i. e.*, at 6 a. m. At 6 a. m. the second aeroplane, put over on the starboard hand, follows the course indicated and returns at 7 a. m. From this on, the two machines alternate in flights of 1 hour duration, until nightfall, which is assumed at 6 p. m. It is thus seen that each machine has a total of only 6½ hours of flying per day, allowing a period of 1 hour between flights for any repairs that may become necessary.

By the above method the limits of visibility for their scouting tour are defined by the broken lines *NN'* and *MM'*.

Assume that the enemy took a course *BK*.

The scout alone would then make contact at the point *C*, between noon and 1 p. m. Equipped with aeroplanes the scout would have

discovered the enemy not later than 7.30 a. m., 5 hours sooner than otherwise.

If the enemy had left *B* 4 hours later than assumed, it would have crossed the course of the scout 80 miles in the rear of the latter. The use of aeroplanes would have brought the enemy into visibility from 5.30 a. m.

If the enemy had left *B* 4 hours earlier than assumed, it would have crossed the scout's course ahead between 8 and 9 a. m., distant over 90 miles.

The use of aeroplanes would have brought the enemy within visibility between noon and 12.30 p. m.

Within the limits of the angle *ABK'* it is impossible for an enemy to leave *B* within 4 hours on either side of midnight, at a speed not greater than 15 knots per hour, and fail to come within the visibility of the scout's hydroaeroplanes.

Furthermore, within the limits of the angle *ABL* it is impossible for an enemy, whose speed is 20 knots or less, leaving *B* not earlier than midnight, to escape discovery. The only feasible plan by which an enemy leaving *B* could avoid a scout would be in a similar employment of flying machines to keep an eye upon the scout's movements.

It is therefore obvious not only that the hydroaeroplane is an important and valuable asset to a fleet and its accessories, but also that when placed at the disposal of one party to a conflict, it becomes indispensable to the other. With the addition of radio telegraphy, which was not taken into account in the above instances, the radius of operations of the aeroplane and the consequent effectiveness are vastly increased.

The Navy Departments throughout the powers of Europe are alive to the importance of the above facts. The same is quite true with our own department, but foreign powers have the great advantage of having public opinion, as well, keenly awake to the issue. It is with no effort that France or Germany or England obtain the funds essential to the building and maintenance of aircraft; public opinion demands such action. In France and Germany popular subscriptions have been little short of half the legal appropriations; and not until the subscription for 1913 is cited—an average of $1,000,000 for each country—do we realize the magnitude of their programs.

These powers do not stop at offering great inducements to naval

aviators; their bounties extend even to the aeroplane companies. England's policy, slightly different from that of Germany, has recently developed the Sopwith hydroaeroplane, which, in point of speed, efficiency and stability both upon rough sea and in air, "literally galloped away," to use the French critics' expression, from all competitors in the international meet at Monaco. The policy of Germany has been such that for 1913 the number of her aeroplane companies increased by 30 and the number of brevetted pilots by 600. Aiming at the basic essential of military aeronautics, the Germans hold the endurance records.

The French are not only the pioneers of aeronautics, but are also still its leaders. Within the last year the great naval maneuvers in the Mediterranean were the world's first to bring the hydroaeroplane into an active important part of the joint exercises with battleships, scouts and submarines. Nor were these maneuvers of a mere experimental nature. Over-sea flights and scouting tours had, for a number of months, been an assured development of the various aeronautic stations at French ports. Three bases had been established on the Mediterranean, Toulon, Ajaccio (Corsica) and Bizerte (French Africa), at which points complete aerial squadrons had been mobilized. In addition to these stations ashore, the hangar ship *Foudre* had been fitted with two hydroaeroplanes, a Caudron and a Voisin, spare parts, etc., and the necessary equipage for making repairs. The Caudron was able to launch from a runway, while the Voisin was hoisted out similarly to a ship's boat. After flights, both machines were hoisted in by a crane.

The general plan of the French maneuvers, executed under the direction of Vice Admiral Boue de Lapeyrère, was as follows:

One enemy fleet under the command of Rear Admiral Tracou, coming from the direction of the Bolearic Islands, was to blockade some of the ports of South France and Bizerte, and was to attack one of them—Bizerte.

The fleet under Rear Admiral Lacaze was to oppose this blockade. Obliged at once to defend the coast of Provence and that of Algiers, Admiral Lacaze divided his aeroplanes into two groups with bases at Toulon and Bizerte, respectively.

At Bizerte the squadron was composed entirely of Nieuport hydroaeroplanes piloted by Lieutenants de Vaisseau Delage, l'Escaille, Destrem and the reservist Levasseur, using the Rhone and

Gnome motors of 80 and 100 h. p. These monoplanes, of the most recent type for the speed-scout, carried fuel to last from 5 to 6 hours at a minimum speed of 80 m. p. h.

The squadron at Toulon was composed of five machines, principally biplanes of the Breguet and Voisin type, with Gnome and Salmson motors of horsepowers varying between 100 and 200. The pilots were Lieutenants de Vaisseau.

The two Breguet biplanes carried interesting and important equipment. Lieut. Dutertre's machine carried a lighting system specially designed for night work, and the Means system of smoke signals. Moineau's machine carried a radio set capable of sending 125 miles.

The cruiser *Foudre* was sent by Rear Admiral Lacaze to Ajaccio with the purpose of keeping an eye upon the coasts of Corsica, but in the course of the maneuvers she received even additional duties.

Many details of the official reports of the maneuvers have been held strictly secret by the French Minister of Marine. But it could not be concealed that the first real collaboration of hydroaeroplanes with naval maneuvers gave such important results as to demonstrate, even to the doubtful, the necessity of these new instruments of maritime war.

The squadron of Toulon, though not assigned the most active rôle, performed brilliantly all that was required, making excellent reconnaissances as far as 80 miles from the coast.

The hydroaeroplanes of the *Foudre* played a very important part, especially in their thorough reconnaissances of the Corsican coast.

It was, however, the squadron of Bizerte that performed the hardest and most useful service. The Nieuport hydros and the excellent pilots of that squadron, compelled, in the consummation of a heavy task, the admiration of the entire French fleet. It was upon the heels of the instruction of the Commandant of Bizerte that Lieutenants de Vaisseau Delage and Destrem received the order to make an extensive reconnaissance. Putting out from the coast 125 miles, upon a circle of this radius, they fulfilled their theme in all points. One of the hydros made a forced landing upon the high sea, 65 miles from land, but the officer piloting was able to effect his own repairs in spite of the rough sea, and, on account of the excellent qualities of his machine, succeeded in getting off the water, and finished his scouting tour.

The morning of the fight off Bizerte, the four Nieuport hydros discovered and reconnoitred the enemy in a splendid tour of two hours. Lieutenant de Vaisseau Delage scouted back and forth between the scene of the combat and the squadron of ships from Bizerte until the arrival of the latter.

On the sixth day of the maneuvers, all the machines from Bizerte made separate distance scouting tours. Lieutenants de Vaisseau l'Escaille and Delage made reconnaissances of 2 hours each, fulfilling, without accident, the missions assigned to them.

According to the French critics of these exercises, "the feats of hydroaeroplanes completely demonstrated the wisdom of the Minister of Marine in giving to naval aviation every necessary extension. This new service brilliantly won its cause, both officers and machines proving worthy in the most difficult circumstances. It only remains to increase their number and to establish the complete organization of a new corps—an act which France cannot afford to delay."

It can well be added that the French Minister of Marine is no more deeply imbued with the need of aeronautics in navies than the First Lord of the British Admiralty. Mr. Churchill's determination to advance aviation in His Majesty's Navy comes from both study and experience. As a result of his efforts and encouragement, England to-day has, among others, the excellent Sopwith hydro and officer pilots such as Lieutenant Pixton. Fortunately for the British Admiralty, public opinion is equally cognizant of the fact that England's safety depends upon her naval supremacy and that this supremacy cannot remain intact without the hydroaeroplane. The dicta of Sir Percy Scott is most pertinent upon this subject: according to this genius "Cyprus, Malta and Gibraltar, well equipped with aeroplanes to observe the enemy's movements and submarines to attack them, would make egress from the Mediterranean very difficult. Submarines and aeroplanes have entirely revolutionized naval warfare—no fleet can hide from the aeroplane's eye. . . . . In war time the scouting aeroplane will be always high on the lookout and the submarines in constant readiness to respond. What we require is an enormous fleet of submarines and aeroplanes."

More than one critic upon maritime war is of the opinion that the very practical side of an underwater attack is due to the advent of the aeroplane. "Metaphorically speaking, the mechanical gull

may now lead the mechanical sword fish to rip the belly of the mechanical whale. If uninterrupted communication may be maintained between the seaplane and the submarine, then surely that which lies between them afloat, however armored and armed, must succumb. Sir Percy Scott has correctly read the sign of the times."

As a matter of fact every foreign nation, regarded as a power, is directing a strong effort toward naval aviation. England, Germany and France have been cited as specific examples, since they are close to the United States. Italy, Austria, Japan and Russia are in no way lagging behind.

When all this is said and done, the only laggard among nations is the United States. Public education, opinion and sentiment all point to a gross ignorance of aeronautics. The word "airship" is the only word in the vocabulary of the average American to apply to all manner of balloon, dirigible, biplane, and monoplane. The people, as a whole, are five years behind those of Europe, and the subject of aeroplanes is discussed in a chimerical way with little thought of their capabilities, either civil or military. And, to be candid, neither branch of the service is very far ahead of the people.

The question is, What are we going to do about it? A detailed answer is difficult. But, at any rate, the burden is upon the service. It is incumbent upon those charged with the national defense not only to arouse themselves to the issue, but also to show to them whose missions we do, the best method by which this mission can be served. Congress, through the public, may be made to realize the necessity of a strong national defense—which means a strong fleet. But a fleet means more than dreadnoughts, and the commissioned personnel of the navy would be remiss in its duty should it allow our development to proceed upon limited lines until, with a blinded strategic eye, we are forced into action with a modern aggressive opponent.

Meanwhile the United States Navy Aeronautic Station is going ahead with its work, endeavoring to produce naval aviators and to place aviation where it belongs—with the fleet. Limited both in material and personnel, aviation in our navy has had, nevertheless, in a qualitative sense, extensive operations. The cruise to Mexico in which the *Mississippi* carried five hydros and flying boats was but a transposition of the flying school and is the longest

tour that any man-o'-war has ever made upon a similar errand. The methods used in stowing the machines and hoisting in and out was improvised and possibly crude, but the principle was sound and the results good. The machines flew—flew every day for 43 consecutive days, at all times of the day, over both water and land, and in such variations of weather as the climate presented. They were constantly exposed to the elements during this interval, in which there were two summer "northers." And in keeping with the spirit that is fostering aeronautics in the navy, the officers detailed to aviation duty are striving to fit themselves and the material under their charge for any duty the fleet may need in time of war.

DISCUSSION

A Question in Discipline

(See Page 1105, Whole No. 152, July-August, 1914)

Captain T. W. Kinkaid, U. S. Navy.—I think that the author has uncovered most cleverly a weak point in our system. His reference to the turret captain lurking "in his turret like a feudal baron" is delightful.

Remedies have been proposed by the author and by his reviewer, Commander W. W. Phelps, U. S. N.; but I desire to suggest another—plenty of infantry drill. Ships' companies should be landed at almost every opportunity for that inculcation of discipline which no other means can give so well as smartly conducted infantry drills. When "the feudal baron" becomes an infantryman he must look sharp, for orders come thick and fast; and disobedience stands out so prominently as to shock even the most indulgent into taking notice.

Therefore I say: Infantry drill, year in, and year out.

Lieut. Commander T. D. Parker, U. S. Navy.—I beg to add a word to a brief article on "A Question in Discipline" (in the July-August number of the Proceedings) with reference to a comment by Commander Phelps, who says:

"*The writer dwells on punishment,*"

and goes on to show, in effect, that an ounce of prevention is worth a pound of cure.

The writer is so heartily in accord with the view, that he does not willingly find his article pilloried through mistaken identity.

His plea was for a certain end—a betterment in some details of ship life. A form of punishment (in proportion—impersonal—less severe than some reprimands) came in as a means to the end. It is assumed in any such discussion—even in the Navy Regulations—that preventive measures always have a precedence. The question is: When they fail, in the exceptional case, what do? I merely propose a *different system* in the punishments already prescribed, to cover such cases—the substitution of legal punishments *in minor cases* by a divisional officer, for illegal punishments, or for action by the captain in person.

As to the objection (lack of uniformity) urged by some military men to the army method; this might have weight where punishments large and small were given in this way, as in the army, but would hardly be serious with only petty offenses involved, and the captain's approval necessary.

Naval Policy: As it Relates to the Shore Establishment, and the Maintenance of the Fleet

(SEE PAGE 319, WHOLE NO. 150, MARCH-APRIL, 1914)

REAR ADMIRAL W. C. COWLES, U. S. Navy.—The reading of this very able paper has been a great pleasure to me, as the ideas are so sound and forcibly expressed that it must have the serious consideration of every officer of experience.

The underlying principles stated by Captain Hood and the conclusions arrived at seem obvious as those which must control to obtain highest efficiency in the shore establishment.

A distinct recognition is also given to the fact that much time will be necessary and many delays encountered in bringing about the changes required, which makes it important that from as early a time as is practicable every new expenditure for this purpose should be along the lines of the policy laid down and should show value to this end or be eliminated.

Finally, in view of the large appropriations now being made for the naval establishment, and the eventual cost of these facilities, the most rigid economy in all non-essentials should be exercised, and to this end the plan to be adopted should be fixed as soon as practicable.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Annual Dues

The annual dues for 1914 were payable on January 1, 1914. There is no change in dues on account of bi-monthly publication. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practiced by a number of members, both regular and associate. Response to this notice will save the Institute a considerable sum in stationery and postage.

Special Notice

It is believed that the scope of usefulness of the PROCEEDINGS to members of the Institute can be increased and all members are invited to assist in this work. Should any topic occur to you on which you think an article could well be written, or on which you would like to read one, send such topic to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that anyone who can spin such a yarn will submit it.

References

Attention is invited to the following articles which have appeared in the pages of the PROCEEDINGS during the past two years; they treat of subjects which closely concern Naval War College work; a perusal of them should prove profitable:

1912

Co-ordination Before and During War. By Captain F. K. Hill, U. S. N.; page 563, Whole No. 142, June, 1912.

Relations of the War College to the Navy Department. By Captain W. L. Rodgers, U. S. N.; page 835, Whole No. 143, September, 1912.

Notes on the Applicatory System of Solving War Problems, with Examples Showing the Adaptation of the System to Naval Problems. By Members of the Staff, U. S. Naval War College; page 1011, Whole No. 143, September, 1912.

The Strategic Naval War Game or Chart Maneuver. By Captain W. McCarty Little, U. S. N.; page 1213, Whole No. 144, December, 1912.

The Naval War College Course. By Captain W. L. Rodgers, U. S. N.; page 1235, Whole No. 144, December, 1912.

Mental and Moral Training for War. By Surgeon J. F. Leys, U. S. N.; page 1241, Whole No. 144, December, 1912.

1913

Trained Initiative and Unity of Action: The True Bases of Military Efficiency. By Lieutenant Commander D. W. Knox, U. S. N.; page 41, Whole No. 145, March, 1913.

Logistics: Its Bearing on the Art of War. By Commander C. T. Vogelgesang, U. S. N.; page 63, Whole No. 145, March, 1913.

Column as a Battle Formation. By Lieut. Commander D. W. Knox, U. S. N.; page 949, Whole No. 147, September, 1913.

The Naval War College, the General Board and the Office of Naval Intelligence. By Commander W. S. Crosley, U. S. N.; page 965, Whole No. 147, September, 1913.

Scouting and Screening Operations. By Lieut. Commander W. S. Pye, U. S. N.; page 1139, Whole No. 147, September, 1913.

Organization of the Fleet for War. By Lieutenant R. E. Ingersoll, U. S. N.; page 1739, Whole No. 148, December, 1913.

Bureau of Information

The Institute offers its services as a "Bureau of Information" on professional questions and will endeavor to obtain replies from the best qualified sources. Those "Questions and Answers" which are suitable for purposes of general information, will appear in the PROCEEDINGS. It is suggested that knotty questions which come up in professional examinations for promotion may well be submitted to this department.

Membership

Since July 16, 1914, forty-two regular and ten associate members have joined the Institute. The following members have died:

Rear Admiral R. B. Bradford, U. S. Navy, Retired.
Rear Admiral Merrill Miller, U. S. Navy, Retired.

The need for more members continues; bi-monthly publication should make the PROCEEDINGS more than ever valuable and necessary in keeping up with the naval profession; all members are asked to help in increasing the membership.

Naval Academy Graduates' Association Department

It is intended to widen the scope of this Department and make it a means of intercommunication between members of the Association.

Notice

Whole Nos. 145 and 149 of the PROCEEDINGS (March, 1913, and Jan.-Feb., 1914) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., SEPTEMBER 11, 1914.

U. S. S. "K-1."

PROFESSIONAL NOTES

Prepared by LIEUTENANT C. C. GILL, U. S. Navy

GENERAL ARRANGEMENT

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NAVAL POWERS

ARGENTINE REPUBLIC

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Rivadavia.....	27,940	22.5	12 12-in., 12 6-in., 16 4-in.	Fore River Co.	Completed
Moreno.....	27,940	22.5	same	New York Co.	"

NOTE.—Argentine has four destroyers, displacement 950 tons, contracted for (two built at Nantes and two at Bordeaux), launched in 1911 but not yet turned over to the government. Also four additional destroyers of about 950 tons to replace those sold to Greece, building at Krupp's Germania Works. (It is presumed that these destroyers have been taken over by France and Germany respectively, as war measures.)

AUSTRIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Prinz Eugen..	20,010	20	12 12-in., 12 5.9-in., 18 12-pdr.	Trieste	Trial Mar. and Apr., 1914
Szent Istvan..	20,010	20	same	Fiume	Launched Jan. 17, 1914
Ersatz Mon'ch	24,500	22½	10 14-in.	Trieste	To be laid down, 1914
" Budapest	24,500	22½	same	"	" " " " 1914
" Wien....	24,500	22½	same	Fiume	" " " " 1914
" Hapsburg	24,500	22½	same	Trieste	" " " " 1915
Small Cruisers					
Saida.....	3,454	27	9 4.1-in.: 2 6-pdrs.	Monfalcone	Trials Apr., 1914
Helgoland	3,454	27	same	Fiume	Launched Nov. 23, 1912
Novara.....	3,454	27	same	"	" Feb. 15, 1913

NOTE.—Three destroyers launched in 1913, displacement 787 tons, nearing completion. Two submarines, displacement 550 tons, and three of 860 tons, contracted for in 1912 are to be built by Krupp Co. There are also 27 torpedo boats of 250 tons displacement in various stages of construction.

NEW SUPER-DREADNOUGHTS.—The latest news regarding the construction of the quartet of super-dreadnoughts is that the first two will be laid down this autumn, launched in 1915, and completed in 1916. The second two are to be laid down next year, and completed in 1917. Two are to be built at Trieste, in the Stabilimento Tecnico, and two at Fiume, in the Danubius yard. The first-named establishment is very well equipped for constructing the largest warships, and will certainly have no difficulty in turning out two 24,500-ton battleships complete within 30 months. The Danubius yard, on the other hand, has only lately been equipped for large construction, and its resources would be severely strained by the simultaneous building of two large capital ships. To obviate delay in the supply of guns and armor, a full contract for the armament has been provisionally placed with the Skoda-Werke at Pilsen, Bohemia. The order comprises forty 13¾-in. guns, with their reserve, nearly sixty 6-in. Q. F., and a large number of smaller weapons. The armor contract calls for a total

weight approximating 18,000 tons. It is understood that most of this armor will be supplied by the Witkowitz Foundries.—*Naval and Military Record.*

NEW AUXILIARIES.—Three interesting auxiliaries are now in hand for the fleet. The first two are sea-going colliers, *Pola* and *Teodo*, one of which was launched at Trieste in May, and the second put afloat in August. The displacement is 12,000 tons, and the coal capacity is 7000 tons. Engines of 8250 horse-power are expected to give a speed of 14½ knots, and the designed steaming radius is 4000 knots. The cost of these two vessels will be £80,000 apiece. The third auxiliary now building is described as a provision transport. The previous rule was to charter a suitable ship to accompany the fleet on its cruises as a provision depot, but in the interests of economy the navy is now to have its own victualling vessel. The displacement is 450 tons, and there is to be cold-room storage for 80 tons of provisions, principally frozen Argentine meat. The cost of this ship will be £13,200.—*Naval and Military Record.*

AUSTRIAN CRUISER MENACE.—Being rather deficient in light cruisers, the Austro-Hungarian fleet could ill afford the loss of the vessel of the *Aspern* class which was sunk by the French off Budva, in the Adriatic. Austria has only four light cruisers under twenty years of age. Three of these belonged to the *Aspern* type, of about 18 knots; the other is the much newer *Admiral Spaun*, of 26 knots. A few cruisers of the latter sort would be found useful both by Austria and France at the present juncture, but particularly by Austria. With a speed of 26 knots, they ought to be capable of a good deal of scouting work without risk of capture. We do not know if the *Admiral Spaun* was among the ships discovered by the French when they swept up the Adriatic but she could, and possibly did, escape from the French fleet, whereas the *Aspern* and her class could not. Austria will doubtless hurry on the completion of the three sister ships to the *Admiral Spaun*, the *Saida*, *Helgoland*, and *Novara*, which were all launched in 1912-13, and should not be far off the commissioning stage. By so doing she would provide the Anglo-French fleet with a pretty little problem in endeavoring to catch them. Probably 23 knots is the limit of speed of any French cruiser, for our neighbors have favored heavy vessels of large gun-power. In the British fleet in the Mediterranean when war began, however, there were four vessels of the *City* class of 25 or 26 knots. These would certainly, we may assume, work with Admiral de Lapeyrère's ships in any attempt to run the Austrian cruisers down and prevent them harassing trade. On the other hand, the commanders of some of the fine destroyers which France possesses, which have a speed of from 30 to 35 knots, would doubtless welcome an opportunity of showing their skill in the same way that the British third flotilla did when it was sent out to find and sink the *Königin Luise*.—*Army and Navy Gazette.*

BRAZIL

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleship Rio de Janeiro	28,000 to 30,000	..	8 or 10 15-in.	Armstrong, Whitworth & Co.	Contracted for Feb., 1914

NOTE.—Three submarines, contracted for in 1912, to be built at Spezia, displacement 330 tons, were ready Aug. 1, 1913, and two have been turned over to the government.

CHILE

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Almirante Latorre	28,000	23	10 14-in., 16 4.7-in.	Armstrong, Whitworth & Co.	Launched Nov. 27, 1913
Almirante Cochrane	28,000	23	same	"	Laid down Jan. 22, 1913

NOTE.—Of the 6 destroyers of 1830 tons, built by J. S. White & Co., two have been delivered. Two submarines of 420 tons displacement have been contracted for to be built by Elec. Boat Co., Seattle. (Vessels building in England have been taken over by that country as a war measure.)

The two Chilean destroyer leaders, built by J. S. White & Co., East Cowes, which have been taken over by the British Government, will be named the *Faulkner* and *Broke*. They were originally named the *Almirante Lynch* and *Almirante Condell* and measure 320 ft. by 32.5 ft. by 11 ft., with 1850 tons displacement, 27,000 horse-power and 31 knots speed. Four sister ships are in course of construction.

CHINA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Light cruisers					
Fei-Hung	2,600	22½	2 6-in., 4 4-in., 2 3-in., 6 3-pdr.	N. Y. Ship Bldg. Co.	Sold to Greece
.....	4,800	27	.....	Monfalcone	Ordered Nov., 1913
.....	1,800	24	.....	"	Contracted for Sept., 1913
.....	1,800	24	.....	"	same
.....	1,800	24	.....	"	same

NOTE.—Four destroyers, displacement 400 tons, are building, one at Trieste and three at Schichau. The three Schichau boats have been delivered.

MAGAZINE BLOWN UP.—A terrible explosion occurred above the after-magazine of the Chinese gunboat, *Tung-Chi*, August 22, shortly after 11 p. m., while she was lying at anchor in the Whangpoo River abreast of Kiangnang arsenal. It blew the midshipmen's quarters, which are situated just above the magazine, to atoms, as well as the 'tween decks overhead and the main deck, with the companion and skylights, portions of which were thrown overboard bodily. Immediately after the explosion flames leapt into the air, reaching a height of 30 feet above the deck. The fire brigade soon had the fire under control, and flooded the magazine.

When daylight came it was found that the vessel's hull had not suffered any external damage except that the main deck had bulged about six inches. The ship was not leaking, or in any danger. It was at first feared that all the midshipmen, numbering 36, must have perished. Twenty-two bodies have been recovered, the other 14 having been away on shore leave at the time of the accident. The midshipmen killed are nearly all Cantonese.

In an interview afterwards, Admiral Tseng-Ju-Cheng, Military Governor of Shanghai, expressed the firm conviction that the explosion was due solely to defective cordite, to which may be added the high temperature in the magazine, which had no cooling apparatus.

The *Tung-Chi* was built at Foochow, and took part in the defence of the Kiangnang arsenal summer before last. She was under orders to sail with a consignment of special bank notes, which were to be used for the redemption of the depreciated Canton notes, and the relief of sufferers in the recent floods in the Canton delta.—*Central News.*

DENMARK

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Niels Juel.....	3,675	16	2 9.4-in., 4 5.9-in.	Copenhagen	Laid down Sept., 1913

NOTE.—Three destroyers are under construction at Copenhagen and three submarines, displacement 200 tons, are being built by Whitehead Co.

FRANCE

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
France	23,092	20	12 12-in., 22 5.5-in.	St. Nazaire	Trials April, 1914
Paris.....	23,092	20	same	La Seyne	" Mar. 15, 1914
Bretagne.....	23,172	20	10 13.4-in., 22 5.5-in.	Brest	Launched April 21, 1913
Provence.....	23,172	20	same	Lorient	" April 20, 1913
Lorraine	23,600	20	same	St. Nazaire	" Sept. 30, 1913
Languedoc	24,828	21.5	12 13.4-in., 24 5.5-in.	La Seyne	Laid down April 28, 1913
Normandie....	24,828	21.5	same	St. Nazaire	" July 5, 1913
Flandre.....	24,828	21.5	same	Brest	" Oct. 10, 1913
Gascogne.....	24,828	21.5	same	Lorient	" Oct. 1, 1913
Bearn	24,828	21.5	same	La Seyne	Contract Jan. 7, 1914

NOTE.—There are approximately six destroyers and 23 submarines under construction.

BATTLESHIP STRENGTH.—The new ships of 23,457 tons, *France* and *Paris*, have been commissioned and added to the fleet, the *Paris* on completing her trials, during which she maintained 21 knots for ten hours, and the *France* on her return from the Baltic. As the latter maintained on her way back a mean speed of 19.5 knots without giving trouble, she is estimated to answer all requirements in what concerns her motors. As to the armament of these dreadnoughts, though it has not passed through the regulation tests, it has benefited from the experience gained in the *Barts*, of the same series, and no fears are entertained in regard to its efficient working. With the six *Dantons* of 18,000 tons, and the two *Barts*, these newcomers bring to 10 the number of French ships of the dreadnought

class, on which will fall the brunt of the fighting. But the French superiority is much greater than appears on the surface, when it is remembered that of these Mediterranean dreadnoughts the six *Dantons* are the only ones that have been long enough in service to acquire their full battle value. Even the *Barts* are inferior in that respect, though better off than most of their Austrian rivals. Considerations of that order explain the high esteem in which are held the five *Patries* of 15,000 tons, which have all along proved splendid steamers and hitters at battle practice, and were during the last maneuvers handled with greater skill and success than was displayed in the case of newer units. It is this same familiarity of crews with the "instruments de combat" they would have to handle in action that lends some worth to the obsolete 12,000-ton battleships of the "division de complement."—*Naval and Military Record.*

NEW SUPER-DREADNOUGHTS.—It is intended to order at an early date the *Duquesne, Tourville, Lyon,* and *Lille,* of 29,700 tons, 16 guns of 13.4-inch, and 22.5 knots, especially since our naval authorities no longer entertain any doubt as to the crushing superiority of these super-dreadnoughts over their smaller Italian (26,000 tons) and Austrian (24,500 tons) contemporaries, which are, as a matter of fact, inferior both for armament and protection to the five quadruple-turret *Normandies* (25,300 tons), now building. Their designs have been completed in every respect, and no change is to be made in their submarine defence, the disposition of which came up to expectations in the recent experiment in the *Devastation.* Though they will be laid down several months after the Italian *Colombos* and the Austrian *Monarchs,* they are confidently expected to be ready before them, which is likely to be the case if France can manage to maintain her actual relative superiority for battleship construction. Unfortunately, this will not prevent the numerical supremacy passing in 1918 to the Austro-Italian side, which will array 18 dreadnoughts against 16 French (the *Dantons* not included). The ordering next year of a fifth *Tourville,* the last ship of the Lapeyrère program, will be insufficient to meet the situation, and the demand that four capital ships should be simultaneously laid down early in 1916 (three being additional), is assured of strong support in Parliament. The Gauthier supplementary program, at present in preparation, is to be submitted to the approval of the Marine Committees of the Chambers with a view to avoiding the fate of the Baudin's and other paper programs.—*Naval and Military Record.*

THE NAVAL RENOVATION.—The warm tribute which Admiral Roussine, chief of the Russian Admiralty staff, after witnessing battle and tactical exercises off Corsica, paid to the work of renovation accomplished since the time of his previous visit to France (1907), must be said to be fully justified by the wonderful improvements made within the last few years in the organization, resources, and fighting capabilities of the French Navy. As a matter of fact, outside of Russia, perhaps, no other fleet has effected such rapid strides, when it is remembered the apparently hopeless situation of the Marine Républicaine in 1907, with out-of-date battle squadrons which Commander-in-Chief Touchard publicly pronounced to be "disarmed" for want of reliable ammunition and efficient firing methods, with badly-equipped and managed dockyards notorious for their slow rate of construction, and with a budget amounting barely to £12,000,000, and the deepest pessimism pervading the whole service.

With that paper force of yesterday the actual French fleet has hardly preserved any point of similitude, so different has it become in its spirit, achievements and prospects; and the change is all the more remarkable when is considered the extent to which naval progress is being handicapped by the ministerial instability inherent to the Republican régime. The naval expenditure for 1914 will, with supplementary credits, nearly reach £26,000,-

000, which is slightly in excess of the corresponding German expenditure and much more than the combined marine budgets of Austria and Italy. whilst the Lapeyrère Naval Law and the creation of an Admiralty Board on English lines ensure the rational utilization of these adequate estimates, as can be shown by the fact that the Gallic Navy is at present only excelled by England for the number of battleships in hand or in project (14), and for the rate of battleship construction. Our state arsenals, which required five or six years to complete pre-dreadnoughts, have demonstrated their ability to deliver 23,000-ton dreadnoughts within 32 months from the laying down of the keels, whilst private yards, unhampered by official red-tape, can achieve similar work in 27 months. But it is at sea that the greatest and most welcome change has taken place. Stability and competence in the command of the battle fleet and the habit of long-range battle practice with full charges, and of constant training at sea in all conditions of weather have worked wonders and substituted unreserved optimism for the pessimism of a few years since, causing Admiralissimo, a man of action and of few words, to declare to his captains that "on the whole he considered the fleet equal to any task likely to be entrusted to it"—a judgment endorsed by the Muscovite experts who witnessed the war preparations off Toulon. Not only have French seamen become proficient in the handling of the gun and torpedo, but they are decidedly engaged on the path to progress and lead in a few important directions, having been the first, for instance, to study in practice the problem, open to such vast possibilities, of the co-operation of submarine and aerial flotillas with battleships.

The rapidity and smoothness that marked the shipping of coal, ammunition, and war stores, the completing of crews, and the effecting of small repairs on board the 24 large armored ships (two *Courbets,* six *Dantons,* five *Patries,* four *Suffren-Gaulois,* and seven *Gambettas*) mobilized in the Mediterranean, that were made ready for sea in much less time than had been anticipated, testify both to the keen zeal of the personnel and to the ample resources of the Toulon arsenal.

In the struggle for the command of the Mediterranean, the French Navy is conscious of having on her side moral assets of the utmost importance. Besides having earned a universal reputation as a strong and clear-sighted man by his firm administration of the Admiralty, which he contributed more than anyone else to bring anew on the path of progress, Commander-in-Chief de Lapeyrère has proved a conspicuous success at the head of the battle fleet, which he has during the last four years trained on up-to-date and methodical lines, giving special attention to sea practice, tactics of offence and gunnery, and imparting to his subordinates his own spirit of initiative and untiring activity. This invaluable stability in the high command is only slightly depreciated by the fact that the able Admirals Chocheprat and Lebris have been a short time in command of the Première and Deuxième Escadres. Not only is Mons. de Lapeyrère an experienced leader, but his seniority and the unique authority he enjoys render it certain that there will be no interference with his well-thought-out plans of action, elaborated with the full knowledge of the capabilities of his force, and that the operations of the battle fleet will not be directed from Paris, as has too often occurred in the past with disastrous results.—*Naval and Military Record.*

LIMITATIONS OF TORPEDO CRAFT.—The Channel maneuvers have, once more, been the means of throwing light on the limitations of torpedo-craft, especially of submarines. The Channel underwater flotillas, which on previous occasions were prevented by rough weather from reaching their intended prey, were this time similarly handicapped as the result of persistent fog, and have more to boast of in the efficient working of their motors and of the endurance of their crews than of the accuracy of their torpedoes. The four submarines detailed for the defence of Brest

failed to catch the enemy (cruisers and flotillas), though informed beforehand of his probable route (an area of 50 miles by 40). The conclusion is that an enemy crossing the Channel need not trouble about submarine dangers in rough or misty weather, and has little to fear at ordinary times provided hostile flotillas are kept in ignorance of his intended route. To Frenchmen it is a warning that the most favorable field of operations for submarine craft is in the immediate vicinity of the foe's naval bases, and that a vigorous offensive at the outset of hostilities is the course best suited to submarine weapons, a side of the problem that has not escaped the attention of the Rue Royale authorities.

LOSS OF SUBMERSIBLE "CALYPSO."—The loss of the 351-ton submersible *Calypso,* like in the case of the British *C 11,* is the result of an accident of surface navigation, and in no way ascribable to the risks inherent to the submarine type. Defects in her steering gear when steaming on the surface in line ahead, some 100 meters separating the boats, caused her to be suddenly thrown across the route of her sister ship *Circé,* which rammed her amidships, tearing a huge gap in her motor compartment, and sending her almost immediately to a depth of some 150 meters. Despite heavy seas running, the majority of the crew were on deck, thus availing themselves of the relatively high freeboard which is a characteristic feature in all *Laubeuf* submersibles, which explains why only one man went down with the boat, though two died subsequently from exposure and a fourth was grievously wounded. The accident to the *Calypso* is far less disquieting than the terrible catastrophes to the *Pluviôse* and *Vendemiaire,* which were rammed when attempting to rise to the surface under conditions leaving no hope whatever for their crews. It is essentially an accident of a preventable sort, given steering appliances in good working order and watchfulness on the part of commanders, two points certain to receive attention on the part of the Paris Admiralty. The sangfroid displayed by the seamen of the unlucky submersible is a gratifying feature in the disaster. It speaks of sound training, of good selection in the men chosen for submarine service and also of the much-minimized dangers of submarine navigation. There is no need of exaggerating the material loss the French Navy has suffered by being deprived of the *Calypso.* This contemporary of the British *B* class, and her sister ship *Circé,* both built at Toulon, have all along given no end of trouble, though their Diesel motors, made in Germany, proved on the whole successful.—*Naval and Military Record.*

NOUMEAN CANNIBALS PUNISHED.—The French warship *Kersaint* arrived on July 27 at Noumea from Vila. She visited Malekula in company with H. M. S. *Torch* on July 4 to punish the natives, who recently killed and ate some teachers there.

A company of marines was landed from each vessel, accompanied by miliciens, or native troops, French and English, from Vila. Nothing untoward happened during the landing, but after the troops had proceeded some way in the bush the natives attacked them, and several skirmishes took place during the ensuing 48 hours. Four miliciens, French and English, were killed, and four were wounded. Only one native of Malekula was taken prisoner. A quartermaster of the *Kersaint* had his head grazed by a bullet.

Both companies returned on board the warships, being short of ammunition and food. Operations were greatly impeded by the dense bush.—*Naval and Military Record.*

A DREAM OF UNIVERSAL PEACE.—Last July the French War Minister, while making grave admissions, sought to explain the starving of the army by saying that France had indulged in a dream of universal peace until the

Agadir crisis came to awaken her to realities. That does not explain the continued refusal to provide proper equipment until this day. Members of the French Parliament seem to have thought more about turning successive governments out of office than of providing for national defence. A curious similarity is revealed between the errors now confessed and the lamentable experiences of 1870. Had war broken out in the last few years, soldiers would have had no boots to march in except those on their feet—the reserves were thirty years old. The frontier defences on which such store has been set would have crumpled up under German attack, for some of the forts date from 1878 and 1880, and have not been brought up to date. Incredible as it sounds, they were not even linked up by telegraph, so that one would not have known what the other was doing. All this is courting rebuffs at the outset, when so much depends upon success. Similar inferiority to the Germans has been officially admitted in the matter of wireless telegraphy upon the frontier. War ministers, knowing the danger in which the country stood, must have endured many hours of mental agony during recent crises when war was by no means remote. The gravest count in the indictment, however, concerns the deficiency in artillery. The next war is likely to have the character of a succession of artillery duels. Yet the French admit a superiority on the part of Germany of 866 guns, the advantage being especially great in heavy caliber weapons. Ammunition is correspondingly short on the French side. It would be difficult to imagine more complete failure on the part of French governments to keep the army up to the strength demanded of it. England, perhaps, has little title to reproach her neighbor in view of her own deplorable neglect of military defences, but Russia can and will make her voice heard in protest. The St. Petersburg Government is not likely to tolerate a state of affairs on the part of their ally in which she is liable to heavy defeats from the outset. In connection with the three years' service Russia has already sharply reminded France that she must make the sacrifices which her position entails, and it is to be feared that M. Poincaré will have a somewhat stormy interview with the Russian minister when he has to explain the latest revelation of failure. Now, however, that the truth has been openly confessed, the French people are likely to insist upon a thorough overhaul of the military position, and furnish the money which has in the past been so unwisely withheld or misspent.—*Naval and Military Record.*

The French people have every reason to be shocked and dismayed at finding that the army has been neglected in vital particulars over a long series of years. Excited debates which have just taken place in the Senate put the seriousness of the question beyond all doubt. The army, it is asserted, is not fit to take the field against Germany. Had war broken out at any time within the last 10 years there is only too much reason to believe that the deplorable surprises of 1870, or those of English military unpreparedness in 1899 would have been repeated. Against the Boers England had time to repair her shortcomings, but against Germany the Republic would enjoy no such opportunity. The disquieting revelations made by M. Charles Humbert last week have been confirmed in all important particulars by M. Messiny, the French Minister of War. How gravely the situation is regarded may be gathered from the postponement for a time of the French President's departure for the State visit to Russia. France has received a rude shock. The deficiencies are due not to lack of information of her neighbor's action, but to deliberate neglect by successive governments extending over a long period of years. The truth would not have come out now but for the patriotic stand made by M. Humbert, and a disagreeable feeling exists that in all probability the public does not yet know the worst.—*Naval and Military Record.*

GERMANY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Grosser Kurfürst	26,575	23	10 12-in., 14 5.9-in., 12 3.4-in.	Hamburg	Launched May 5, 1913
Markgrat	26,575	23	same	Bremen	" June 4, 1913
König	26,575	23	same	Wilhelmshaven	" Mar. 1, 1913
Kronprinz	26,575	23	same	Germania	" Feb. 21, 1914
Ersatz Worth	29,000	....	8 15-in., 16 5.9-in.	Kiel	Laid down Sept., 1913
"T" 1913	29,000	....	same	"	" May, 1913
Ersatz Friedrich III	30,000	....	8 15-in., 18 5.9-in.	....	" summer 1914
Cruisers of the Line					
Lützow	28,000	28.5	8 12-in., 14 6-in.	Dantzig	Launched Nov. 29, 1913
Derfflinger	26,500	28.5	same	Hamburg (Blohm & Voss)	" July 1, 1913
Ersatz Hertha	28,000	28.5	8 12-in.	Wilhelmshaven	Laid down July, 1913
Ersatz Victoria Louise	....	....	....	....	" summer 1914
Protected Cruisers					
Karlsruhe	4,900	28	12 4.1-in., 2 t. t.	Germania	Commissioned
Rostock	4,900	28	same	Howaldt	"
Regensburg	4,900	27.5	12 4.1-in.	Bremen	Launched Apr. 30, 1914
Graudenz	4,900	27.5	12 14.1-in.	Kiel	" Oct. 25, 1913
Ersatz Hela	5,500	27.5	10 6-in.	"	Laid down fall 1913
Ersatz Gefion	5,500	27.5	same	Stettin	" "
Ersatz Niobe	....	....	....	....	" summer 1914
Ersatz Gazelle	....	....	....	....	same

NOTE.—Germany has twelve destroyers and twelve or more submarines under construction. Tonnage of ships building uncertain.

BATTLE CRUISER "DERFFLINGER."—This vessel is the first of a new type whose principal feature is a reduction in the number but an increase in the caliber of the heavy guns. The *en echelon* disposition of the turrets which was adopted in the first four ships has since been recognized as less satisfactory than a purely center-line arrangement. Hence the four twin-turrets of the *Derfflinger* are all on the center line, with the guns in the second and third firing over the first and fourth turrets. As far as can be gathered from the particulars now revealed, this vessel presents no other very noteworthy feature. The following table shows the main points of difference between the *Seydlitz* and the *Derfflinger*:

	Seydlitz	*Derfflinger*
Laid down	Winter, 1910.	Winter, 1911.
Completed	Spring, 1913.	Summer, 1914.
Displacement	25,000 tons.	26,600 tons.
Length (water line)	656 feet.	688 feet.
Breadth	93½ feet.	95 feet.
Draft	26 feet 11 in.	27 feet 3 in.
Designed i. h. p.	63,000.	63,000.
Designed speed	26.5 knots.	26.5 knots.
Machinery	Parsons turbines.	Parsons turbines.
Boilers	27 Schulz-Thorn.	18 Schulz-Thorn.
Armament	Ten 11-in., 50 cal. Twelve 6-in., 45 cal. Twelve 3½-in. Four T. Tubes (19¾-in.).	Eight 12-in., 50 cal. Twelve 6-in., 50 cal. Twelve 3½-in. Four T. Tubes (19¾-in.).
Broadside	7216 lbs.	7486 lbs.
Officers and men	1108.	1125.

The surprising reduction in the boiler plant of the *Derfflinger* will be noted, as also the fact that in each case the designed i. h. p. is the same, despite the greater dimensions of the new ship. The power figures, however, are quite nominal, as the *Seydlitz* on the measured mile worked up to 89,738 s. h. p., which gave a maximum speed of 28.129 knots, and it is expected the *Derfflinger* will do equally well.

DESTROYERS.—The present year will also witness an addition to the strength of the torpedo force in full commission. Last year there was formed at Wilhelmshaven the seventh destroyer flotilla. This autumn an eighth flotilla is to be created, which will probably be stationed in the North Sea. This signifies that Germany will have 88 fully-manned destroyers at her disposal. The boats, it is well known, are built in groups of twelve, of which eleven go to form a flotilla, leaving one in reserve. By this system it is possible to keep each flotilla always at full strength, for, should one boat be disabled or need repair, its place is at once taken by the reserve unit. There is a good deal to be said for this system, and it compares very favorably with the British practice of giving each destroyer flotilla a paper strength of 20 boats. Torpedo-craft, even the best and latest of them, are notoriously fragile. A destroyer is a highly complicated and delicate box of machinery, apt at any moment to get out of order in spite of most careful handling. Knowing this, the German Navy prefers to keep one boat of each group ready at hand to fill up a gap in the flotilla caused by mishap, and should this occur the crew of the disabled destroyer are simply transferred to the relief, which immediately commissions and joins her sisters, whilst the lame duck is docked for repairs.—*Naval and Military Record.*

SUBMARINES.—A communication issued to the *Press* explains the organization of the German submarine flotilla. On July 1 two full flotillas were in commission, each consisting of 11 boats. Each flotilla is under the orders of a commander, and each half flotilla under a lieutenant commander. Attached to the first flotilla as depot ship is the light cruiser *Hamburg*, the *Stettin* acting in a similar capacity to the second flotilla. The first flotilla has been in existence since January 7, 1913. The larger number of boats completed since that date have enabled a second flotilla to be formed, and a third will probably be constituted next year. The "Inspection of Submarines" was created on March 15, 1914. This section includes, besides the above-mentioned two light cruisers, three destroyers (*D 5, S 99, S 101*), three old vessels as depot and living ships, and the salvage vessel *Vulcan*. A second *Vulcan*, now building at Danzig, will be attached on completion to the North Sea station. The papers add that the 27th submarine is now in service, and that the *Laurenti* type boat, which was ordered from the Fiat San Giorgio at Spezia, will shortly be delivered.

CONSTITUTION OF THE HIGH SEA FLEET.—The following information relating to the new disposition of the High Sea fleet, which is to take place this year, is imparted by the official annual known as *Nauticus:*—On October 1, 1913, the third squadron was created and based on Wilhelmshaven (transferred to Kiel from April 1, 1914). At first consisting of four ships, it has risen to six units, all of the latest type, whilst the commissioning of the *Markgraf* in November will bring it almost up to full strength. From the first (North Sea) squadron, which since May, 1912, has consisted of the first eight dreadnoughts, the *Westfalen* will be withdrawn in the autumn and transferred to the second squadron. These changes will result in the High Sea fleet being constituted as in the following table, which represents the position at the close of the present year:

Fleet Flagship, Friedrich der Grosse

1st Squadron (Wilhelmshaven)	2d Squadron (Kiel)	3d Squadron (Kiel)
Ostfriesland (flag).	*Westfalen* (flag).	Kaiser (flag).
Thüringen.	*Schl.-Holstein.*	*Kaiserin.*
Helgoland.	*Schlesien.*	*König Albert.*
Oldenburg.	*Pommern.*	*Prinz Luitpold.*
Rheinland.	*Deutschland.*	*Grosser Kurfürst.*
Nassau.	*Hannover* (flag).	*Markgraf.*
Posen (flag).		*König* (flag).

Scouting Ships

Battle Cruisers (Wilhelmshaven)	Small Cruisers (Wilhelmshaven)
Seydlitz (flag).	*Köln* (flag).
Moltke.	*Strassburg.*
Goeben.	*Breslau.*
Derfflinger.	*Stralsund.*
Von der Tann (flag).	*Rostock.*
	Dresden.
	Regensburg.
	Graudenz.

Tenders

Hela, Blitz, Pfeil, and seven destroyers.

Of the scouting ships, the *Goeben, Strassburg, Breslau,* and *Stralsund* are to be kept in the Mediterranean until further orders.

It will be seen from the above list that some sacrifice of homogeneity has been made in order to keep the second squadron at six units. Commenting on this, *Nauticus* declares that homogeneity has ceased to be an important quality now that three tactical units have become available. The reorganization of the fleet on these lines has no doubt been governed by tactical considerations, but at the same time it has provided the authorities with a very strong argument in support of their demand for a big increase of personnel. They will now be able to tell the public that the shortage of men is retarding the full development of the battle squadrons, and by this means may prevail upon Parliament to vote the additional officers and men without demur.—*Naval and Military Record.*

A GERMAN HARBOR IN HOLLAND.—The Vulkan Company—or Mr. Thyssen, though the one is identical with the other—has obtained permission to construct a spacious harbor on the New Waterway, within a short distance of Rotterdam. The New Waterway is an artificial cut made about 50 years ago, and capable of floating the largest sea-going vessels. The Vulkan Company builds dreadnoughts for the Germany Navy, as well as the great Atlantic liners which are the pride of the Hamburg-America Company and the North-German Lloyd. The relations between the company and the German Government are so intimate and peculiar that it is difficult to regard them apart. Mr. Thyssen bought the land for his harbor two years ago, and ever since has been urging the Dutch Government to permit him to cut through the foreshore. The public of Rotterdam protested against his scheme; the Ministry promised legislation placing all harbors under public control; and it was only when the Dutch Chamber went into recess that the bargain was secretly completed. Apparently Mr. Thyssen proposes to construct a harbor capable of accommodating dreadnoughts, with a coaling station and the usual accessories, for purely "private" objects. The *North-German Gazette* remarked four years ago: "We cannot remain indifferent if a great power at war with us uses the Netherlands as a base for its fleet, because this base is in dangerous proximity to our coast." Great Britain may echo these sentiments with equal fervor. This "private" harbor will be available for ocean-going vessels, and the space ceded to the German company will be large enough to allow for repairing shops and a repairing wharf.

The point at which the harbor is to be built is little more than 100 knots distant from the East Anglian coast. It will diminish by more than one-half the distance between England and the nearest German port.—*London Times.*

GERMANY IN THE MEDITERRANEAN.—War has shown that the action of the Marine Amt, in stationing a small squadron of ships in the Mediterranean, was an error of judgment. Many German naval authorities opposed this policy from the first. On the other hand, it was contended that when the war came, Germany would certainly have the support of Austria-Hungary, if not also of Italy. The warships under the three flags, it was contended in official quarters in Germany, would combine and form a great fleet which would challenge French and British supremacy in southern waters. What happened? Italy has maintained her neutrality towards both Great Britain and France, and only after France had been driven by Austrian military movement to break off the peaceful relations did the British Government take similar action. The result was that the German ships were in a position of isolated weakness. They steamed about the Mediterranean for a time, and then at last were compelled to run for the Dardanelles, and there the Admiralty anticipates they will be disarmed for the duration of the war —whether Turkey purchases them or not. By one stroke Germany has thus lost the finest of her battle-cruisers, for it is no secret that the newest ships have not proved as good sea boats as the *Goeben,* while the *Breslau* was the swiftest of all light cruisers under the German flag.—*Naval and Military Record.*

GREAT BRITAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Benbow	25,000	22	10 13.5-in., 16 6-in.	Beardmore	Launched Nov. 12, 1913
Emperor of India	25,000	22	same	Vickers	" Nov. 27, 1913
Iron Duke	28,000	22	same	Portsmouth	Commissioned Mar., 1914
Marlborough	25,000	22	same	Devonport	Trials Mar., 1914
Qu'n Eliz'b'h	27,500	25	8 15-in., 16 6-in.	Portsmouth	Launched Oct. 16, 1913
Warspite	27,500	25	same	Devonport	" Nov. 26, 1913
Valiant	27,500	25	same	Fairfield	" Dec., 1913
Malaya	27,500	25	same	Walker	Laid down Oct. 20, 1913
Barham	27,500	25	same	Brown & Co.	Launched Feb., 1914
Roy'l Sover'gn	25,500	21	same	Portsmouth	Laid down, Jan. 15, 1914
Royal Oak	25,500	21	same	Devonport	" Jan. 15, 1914
Resolution	25,500	21	same	Palmer	" Nov. 28, 1913
Ramillies	25,500	21	same	Beardmore	" Nov. 12, 1913
Revenge	25,500	21	same	Vickers	" Jan., 1914
Battle Cruisers					
Tiger	30,000	30	8 13.5-in., 12 6-in.	Brown & Co.	Launched Dec. 15, 1913
Light Cruisers					
Brisbane	5,400	25	9 6-in., 4 3-pdrs.	Sydney	Laid down Jan. 25, 1913
Birmingham	5,440	25.5	same	Elswick	Commissioned, Feb. 3, 1914
Lowestoft	5,440	25.5	same	Chatham	" Apr. 21, 1914
Nottingham	5,440	25.5	same	Pembroke	" Apr. 3, 1914
Aurora	3,600	30	2 6-in., 8 4-in.	Devonport	Launched Sept. 30, 1913
Arethusa	3,600	30	same	Chatham	" Oct. 25, 1913
Penelope	3,600	30	same	Barrow	Laid down Feb. 1, 1913
Phaeton	3,600	30	same	"	" March 12, 1913
Royalist	3,600	30	same	Dalmuir	" June 3, 1913
Galatea	3,600	30	same	"	" Jan. 9, 1913
Inconstant	3,600	30	same	"	" April 3, 1913
Undaunted	3,600	30	same	Govan	Launched April 28, 1914
Cleopatra	4,400	30	.....	Devonport	Laid down Feb. 26, 1914
Calliope	4,400	30	.....	Chatham	" Jan. 1, 1914
Conquest	4,400	30	.....	"	" Feb. 28, 1914
Cordelia	4,400	30	.....	Pembroke	Launched Feb. 23, 1914
Carysfort	4,400	30	.....	"	Laid down Feb. 25, 1914
Comus	4,400	30	.....	Wallsend	" Nov. 3, 1913
Caroline	4,400	30	.....	Birkenhead	" Jan. 28, 1914
Champion	4,400	30	.....	Hebburn	" Feb. 28, 1914

NOTE.—England has approximately 31 destroyers and 24 submarines under construction.

VICE ADMIRAL SIR JOHN RUSHWORTH JELLICOE, K. C. B., K. C. V. O., R. N., who has been appointed to the supreme command of the home fleets, with the acting rank of admiral, is one of the most famous flag officers of the British Navy. Possessed of wide sea experience, a born administrator, and a man of determined but cool judgment, his selection has been received with general approval within and without the service. Until recently he was Second Sea Lord of the Admiralty, to which he was appointed in December, 1912, after having been in command of the second squadron of the home fleet since December 5, 1911. The esteem in which he is held in the navy was proved in 1911, when he was appointed over the heads of eleven vice admirals to the command which he vacated in December, 1912.

Born on December 5, 1859, he is the son of Captain J. H. Jellicoe, himself an old sailor, and well known in shipping circles as a director of the Royal Mail (West Indian) steamers, and the Southampton and Isle of Wight Mail Packets.

Educated at Rottingdean, Vice Admiral Jellicoe entered the Royal Navy as a cadet on July 15, 1872, passing out of the "Britannia" first of his "batch" by over a hundred marks. In the examination for sub-lieutenant, which rank he attained six years later (December 5, 1878), he took three "firsts."

On August 23, 1880, he was promoted lieutenant, and two years afterwards, as a lieutenant on board the *Agincourt*, he served in the Egyptian War, being awarded the Egyptian medal and the Khedive's bronze star. On his return to England he, in the following year, underwent a course of study at the Royal Naval College, Greenwich, where he was fortunate enough to win the special £80 prize for gunnery lieutenants. In May, 1886, while serving on board the *Monarch*, he won the Board of Trade silver medal for gallantry in saving life at sea, by commanding a gig which went to the rescue of a stranded ship near Gibraltar, the sea being so heavy that the boat was capsized, but he and the crew were washed ashore. He served also as gunnery lieutenant of the *Colossus*, and on the staff of the *Excellent* gunnery establishment.

Gazetted a commander on June 30, 1891, he was for a time employed as assistant to the Director of Naval Ordnance, being subsequently appointed first to the *Sans Pareil*, and later to the ill-fated *Victoria*, Admiral Sir George Tryon's flagship, on the Mediterranean station, which was on June 22, 1893, sunk off Tripoli, on the Syrian coast, in collision with the *Camperdown*, when the admiral, 21 officers and 350 men were drowned. At the time of the collision Commander Jellicoe was on the sick list in his cabin, and when the ship capsized he, with the aid of Mr. West, a midshipman, contrived to keep himself afloat until picked up. Commander Jellicoe's silver medal was lost with other effects in the *Victoria*, and the Board of Trade, on being informed of the fact, intimated in true "trading" spirit, that another medal could be obtained on payment!

Four years later, after serving as commander of the *Ramillies*, flagship in the Mediterranean, he obtained the rank of captain (January 1, 1897), and was immediately appointed to the Ordnance Committee. He had not long to wait for further employment afloat, as Admiral Sir E. H. Seymour secured him as flag captain on board the *Centurion*, on the China station. During the expedition to succor the legations at Pekin in 1900, in which he narrowly escaped death by a severe gunshot wound, Captain Jellicoe commanded the Naval Brigade and acted as chief staff officer, when he gained not only the C. B., but was awarded by the German Emperor the second class of the Red Eagle with crossed swords. Returning from China at the end of 1901, he was, in November of that year, appointed to superintend the building by contract of ships of war; he next served as naval assistant to the Controller of the Navy, which post he vacated in August, 1903, to take command of the *Drake*, and in February, 1905, he took up the post of Director of Naval Ordnance and Torpedoes, in succession to Captain Barry. Much has been said about the improvement of good shooting in the navy,

and in this connection considerable praise is due to the present Vice Admiral Jellicoe. Without his help the good work fostered by Vice Admiral Sir Percy Scott would have been heavily handicapped—in fact, impossible; for the then Director of Naval Ordnance proved himself a man of original thought and prompt action, and one of the most capable gunnery experts in the navy. During the time he was in command of the *Drake* he turned it into one of the best shooting ships in the navy, and while he was at the Admiralty as Director of Naval Ordnance, Captain Jellicoe did all that was possible to ensure the guns mounted in ships in the first fighting line being fitted with the most up-to-date day and night sights, as well as to instal a fire-control set of instruments in each ship for "spotting" and controlling at long range shooting. The fittings of the guns and gunnery appliances generally were also greatly improved during the tenure of his appointment. Vice Admiral Jellicoe merits the greatest praise for the promptness with which he brought about the completion of the annual gunnery practices, and in instituting for the first time in the history of the British Navy, the publication not only of the results of the various practices for general circulation, but including information regarding the relative position of the ships and of the fleets, all printed in a compact form on one sheet of paper, which was ordered to be framed and hung up in a conspicuous place on board every fully-commissioned warship. He was promoted to rear admiral on February 8, 1907, and in August of the same year he left the Admiralty to take up the post of second in command of the Atlantic fleet, which he retained until August, 1908. In the October following he returned to the Admiralty as a Lord Commissioner and Controller of the Navy, and during the period of this appointment he had a great deal to do with the construction of the super-dreadnoughts which are now the admiration of the world, and maintain Britain's supremacy in the domain of warships.

He was appointed, on December 20, 1910, to the command of the Atlantic fleet, with the acting rank of vice admiral to which grade he was promoted on September 18, 1911. On December 5 of that year he was given the command of the second division of the home fleet, which he vacated in December, 1912, to return to the Admiralty as Second Sea Lord.

On the occasion of the review of the home fleet in the Solent by King Edward on August 3, 1907, Admiral Jellicoe was created K. C. V. O., and he was advanced to K. C. B. at the coronation of King George on June 19, 1911.

Captain Jellicoe, in 1902, married Florence Gwendoline, daughter of Sir Charles Cayzer, Bart., late M. P. for Barrow-in-Furness, and has two daughters. Admiral Jellicoe's chief of staff, Rear Admiral Chas. E. Madden, is his brother-in-law, Admiral Madden having married Lady Jellicoe's sister. Sir John and his chief staff officer are known to be in the most complete accord on matters of strategy and tactics, and were both associated in the creation and equipment of the ships of the home fleets on which the fortunes of the British Empire will depend. They were members of the famous Dreadnought Design Committee, and were associated with Admiral of the Fleet Lord Fisher in his many reforms in naval administration.—*United Service Gazette.*

"SULTAN OSMAN I."—*New Turkish Super-Dreadnought Taken over by Great Britain.*—One of the new weapons which the Greek and Turkish Governments have found it necessary to acquire in view of the strained relations at present existing is now to be seen in No. 9 dock at Devonport. This is the new battleship *Sultan Osman I,* which is to remain a week in the Royal Dockyard. The vessel was built by Messrs. Armstrong in the Elswick yards, but as she has a length of 642 feet overall, and a beam of 89 feet, there was no dock on the Tyne which could hold her comfortably; hence the decision to send her to Devonport. Between perpendiculars the *Sultan Osman I* measures 623 feet, and draws 27 feet at mean load dis-

placement and 29 feet at maximum draft. On account of her unique design and her previous history, she is of no little interest to the student of naval matters. Laid down originally to the order of the Brazilian Navy on September 14, 1911, as the *Rio de Janeiro*, she was at one time the largest war-vessel under construction in the world. With her displacement of 27,500 tons she shares at present with the Japanese battle-cruiser *Kongo*, delivered by Messrs. Vickers last year, the distinction of being the greatest warship yet completed either here or abroad. However, there are now several warships approaching completion which equal or exceed the new battleship in displacement, such as the *Queen Elizabeth*, of 27,500, the *Tiger*, of 28,000, the *American-Pennsylvania*, of 31,400, and the Japanese *Fuso*, of 30,600 tons. As a matter of fact, for a time after her first keel-plate was laid she was intended to surpass even these monster ships.

A Daring Proposal.—Her designer had in his eye a vessel of 31,600 tons—a very daring proposal at that time—with a total length of 690 feet, and her armament was to have consisted of twelve 14-inch weapons instead of the 12-inch now fitted. Other designs of even greater magnitude, involving the installation in the one case of eight 16-inch, and in the other of ten 15-inch guns, were originally projected. A change in the presidency of the Brazilian States resulted, after some progress in construction had been made, in the substitution of the present 27,500-ton design for the enormously costly ship originally planned. In 1913 the Brazilian Government came to the conclusion that the *Rio de Janeiro* was unsuited to their requirements, and arranged with the builders for the cancellation of the contract. In her stead an order has been placed with Messrs. Armstrong for a battleship of about 30,000 tons, which will be armed with 15-inch guns, more in accord with modern tendencies. The *Rio de Janeiro* was not long in the market before the Ottoman Government raised sufficient money to buy her. Launched on January 22, 1913, the *Sultan Osman I* was eighteen months on the stocks, and has been, thanks to the various incidents related, two years and ten months in the builders' hands. Her present owners are stated to have paid £50,000 more than the original contract price, so that she has cost the Turkish Government £2,725,000 in all.

Large Number of Turrets.—With regard to her design, the new dreadnought is remarkable for the large number of turrets which she carries. Although ships of the Royal Navy have never been equipped with more than five, and opinions favor only four turrets, there are no fewer than seven in this latest product of Elswick. There are at present two schools of design, one of which advocates a small number of guns of the greatest caliber and smashing power possible, and the other, which is led by Admiral Sir Reginald Custance, considers that greater fighting power can be obtained from a ship with a large number of battle guns of moderate caliber, which type is represented by the vessel under notice. The seven turrets which are disposed on four different levels, each carry two 50-caliber 12-inch guns, making 14 in all. Hitherto no ship has had as many main guns, although the Italian *Cavours* and *Duilios*, now in course of completion, have thirteen weapons, which are carried in three triple and two twin turrets. In January of next year the French are to lay down the first pair of the *Tourville* class, with no less than sixteen 13.4-inch guns, concentrated, however, in only four quadruple turrets of great resisting power. As the Elswick 12-inch model of 50 calibers uses a projectile of the usual weight, the broadside fire from the main guns of the *Sultan Osman I*, which can all be turned on either beam, reaches 11,900

pounds, or considerably less than the 14,000 pounds of the new 10-gun *Marlborough*, or the 15,600 pounds of the 8-gun *Warspite*, which is now being completed at Devonport. Each gun weighs 69 tons, and the shell on leaving the muzzle has a velocity of 2960 feet per second, with a consequent muzzle energy of 51,640 foot-tons.

Singular in Appearance.—In general appearance the *Sultan Osman I* is quite singular. On the raised forecastle, which is continued aft as far as the mainmast to form the secondary battery, are mounted two super-firing turrets. On the same level as No. 1 are two more on the axial line amidships, with large arcs of training on each beam, but incapable of bearing right ahead or astern. These are just separated by the base of the massive stump mast carrying a pair of boat derricks and supporting the long platform for stowing the boats, which extends above the turrets from the forward to the after superstructure. On the upper deck aft are the remaining turrets grouped close together, with Nos. 5 and 7 backing on No. 6, which is raised to economize space and provide a greater arc of fire.

The principal conning-tower occupies the usual position behind No. 2 turret, together with the chart-house and bridge, which hides the base of the foremast. This is of the tripod type, with its two supporting legs splayed forward. It carries a third derrick for hoisting out the boats stowed each side of the funnel, which is oval and rises at the extreme aft end of the forward superstructure. The overhead platform for boats runs above Nos. 3 and 4 turrets to the after superstructure, on which are the second and smaller funnel and the mainmast with its legs splayed aft, on either side of the after conning-tower.

Secondary Armament.—Of the score of 6-inch guns, fourteen are disposed in a battery behind 6-inch armor on the upper deck. There are seven casemates on each side of the ship, extending from No. 2 turret aft to a point opposite the mainmast. The remainder are disposed on the next higher level instead of the next lower as in the latest British ships, in which two (and even four in the *Warspite*) are placed right aft on the main-deck level. In the *Sultan Osman I* four of the upper tier are in casemates at the corners of the superstructures, and the other two, protected by open "light-cruiser" shields, are level with the foremast, wide on each beam, to swell the ahead fire to six weapons. Divided between the two superstructures are the twelve 12-pounders, which supplement the heavier anti-torpedo guns.

In addition to the guns the new ship is provided with three submerged 21-inch torpedo tubes.

Armor Protection.—The armor protection consists of a main belt, 9 inches thick, extending at this thickness for a length of 356 feet, and thinning towards the ends to 6 inches and 4 inches, respectively. Combined with this is an upper strake, also of 9-inch armor, which, combined with the main belt, makes up a width of 13½ feet. The main barbettes are likewise of 9-inch armor, so that the armor protection, though fairly complete, is not remarkably thick, in view of the heavy weapons now being installed in warships.

Messrs. Vickers were responsible for the machinery, as well as for that of the *Minas Geraes* and *Sao Paolo*, which were built for Brazil four years ago. The Parsons turbines were designed for 45,000 horse-power, and to drive the vessel at a speed of 22 knots. Steam is supplied from boilers of Babcock type, capable of coal or oil firing.

Comparison with the Warspite.—As the *Warspite* is of approximately the same displacement, and will be ready in a few months, it is interesting to give a comparative table of the chief features of the British and Turkish vessels, because they represent the ideas of two widely different schools of design.

	Warspite	*Sultan Osman I*
Displacement (tons)	27,500	27,500
Length (between perps.)	625 feet	632 feet
Beam (maximum)	90½ feet	89 feet
Armament (main)	Eight 15-in., 45 cal.	Fourteen 12-in., 50 cal.
Weight of projectile	1950 lb.	850 lb.
Armament (secondary)	Sixteen 6-in.	Twenty 6-in.
Torpedo tubes	Five 21-in.	Three 21-in.
Broadside weight	15,600 lb.	11,900 lb.
Axial fire, weight	7800 lbs.	5950 lb.
Speed	25 knots	22 knots
I. H. P.	60,000	45,000
Fuel	4000 tons oil	3000 tons coal (plus oil)
Armor—		
Main belt	13.5 in.	9 in.
Upper belt	10 in.	9 in.
Secondary guns	8 in.	6 in.
Cost of construction	£2,325,328	£2,675,000

Thus the *Warspite* is superior in speed by three knots; she is much better protected, and the weight of her broadside is about 35 per cent heavier than that of the Turkish ship, although opinions differ as to the respective merits of the two armaments.—*Naval and Military Record.*

MANNING OF THE NAVY.—There is still a widespread impression that the navy is desperately short of men, and that the supplementary estimate, introduced recently for 67,000, means that the Admiralty are going to make an effort to obtain this number. This is, of course, an entire misapprehension. There is no lack of men for the navy generally. The number of trained ratings, it is true, is not adequate, and the Admiralty could have done with a great many more junior officers. But these are defects which cannot be made good by entering a large number of recruits, and the naval authorities are endeavoring to remedy it by the re-entry into the service of ex-naval ratings under 55 years of age who possess a satisfactory character. Even in this respect the Admiralty are picking and choosing, and only the best have any chance of being accepted. As to the supplementary vote, it merely means that provision has been made for full pay for the large number of reservists who by the automatic influence of the royal proclamation have joined the active fleet. If public confidence in the fleet is not to be undermined, this satisfactory condition of things should be widely known. Newspapers which are making appeals for 67,000 men to join the navy are doing a disservice to the cause which we have at heart. It should be known far and wide that, contrary to German anticipations, we have more men available at this moment than the Admiralty can employ at once. No one can foresee the course of the war or how long the resources in personnel of the Admiralty will last. In the report of Sir Edward Grey's committee on manning policy, it was claimed that we should lose in naval warfare more ships than men. In other words the presumption is that ships will return to port injured, and that thus it will be possible to transfer the crews almost *en bloc* to new vessels.—*Naval and Miltiary Record.*

TRAINING OFFICERS FOR THE MERCANTILE MARINE.—It is quite satisfactory to find that the *Conway* and other training ships for mercantile marine officers continue to send a very good class of cadet to the Royal Navy. This year the *Conway* has sent one cadet to the Naval College at Osborne, and four to the Senior College at Dartmouth. At the same time this ship has sent about a dozen probationary midshipmen into the Royal Naval Reserve, and these officers undergo a course of training in His Majesty's fleet before joining various lines in the mercantile marine. This training, fol-

lowing on as it does a course of disciplinary training on board the training ships, is of inestimable value to these youngsters before taking up their position as officers in a liner, and must inevitably tend to raise the already high tone of discipline on the quarter-deck of our mercantile marine. The training systems of these merchant training ships have been brought up to date to meet naval requirements during the last few years, and the cadets now learn as much about minor mechanical work and general engine-room subjects as the naval cadets themselves in the early months of their training. This knowledge must be very useful, both to themselves and the large shipping firms who employ them during their later years; and also makes them better fitted to reinforce the naval personnel in time of war. The senior service will need all such help in the hour of trial, for it is obvious that the present lethal weapons will make terrible havoc among the complements of our warships during a modern sea fight.—*United Service Gazette.*

NEW SHIPS FOR THE NAVY.—The nation has reason to regard with gratitude the firm policy which was adopted by the Admiralty in expanding the personnel, and in this respect great praise is due to Mr. Churchill, Prince Louis of Battenberg, and Sir John Jellicoe for the policy adopted during the past few years. When war broke out they were able to congratulate themselves on having by various measures added 20,000 officers and men to the navy. The large navy personnel will prove an asset of immense value. It has already been possible to find crews for the two Turkish battleships and the two Chilian destroyer-leaders, and there is another fleet coming along which will have to be manned. At a very early date crews must be provided for the battle-cruiser *Tiger*, and then will follow the new battleships *Benbow* and *Emperor of India*. We have about half a dozen light cruisers, 25 destroyers, 20 submarines, and other craft approaching completion. Every effort is being made to press on the work. There are also a good many useful ships near completion in private shipyards which were ordered for foreign countries. Among these is a Chilian battleship, as well as several monitors of a useful type, and some torpedo craft. If the war lasts six months the fighting fleet at sea should receive an immense acquisition of strength. We cannot forget that we should have been unable to take advantage of this new fleet had the Admiralty not had the courage and foresight to provide an adequate number of officers and men to man them.—*Naval and Military Record.*

NAVAL INTERPRETERS.—The Admiralty took steps as far back as 1904-5, as will be seen from the First Lord's memorandum of that year, to increase the facilities and inducements to officers of all branches to become proficient in foreign languages. Since that date, not only have officers been granted full-pay leave with allowances to study abroad for the purpose, but others have been allowed opportunities for study at home. Not more than about five officers a year could be spared to go abroad, and executive officers, in regard to which class a shortage of interpreters is to be noted, can be spared least of all at the present time. Only last year, however, a system of prizes, medals, and certificates was instituted to encourage the study of foreign languages and naval history among junior lieutenants. The fact, moreover, that the sum of £4400 is taken in the estimates for gratuities and allowances to officers qualified for employment as interpreters indicates that the number of those actually serving in this capacity is much larger than it was. It is undoubtedly a good thing for more officers to take up foreign languages, but the fact of the matter is that more are doing so, and credit should be given to the Admiralty for their interest and help in this direction.—*Army and Navy Gazette.*

A SUCCESSFUL MOBILIZATION.—The navy may well be congratulated on the success of this year's mobilization, a success that includes not only the smooth and rapid way in which the actual machinery of mobilization

worked in calling up and getting the men on board their ships, but in the way the men took on their old jobs and worked the ships they manned every bit as efficiently and as well as the other ships in the fleet were handled by men who had never left the active service list to spend a spell of, in some cases, several years at an entirely different class of work in civil life. The reservists have proved that so intense was their early training that it had left them sailor-men for all time; while their annual drills have kept them up to date in all the improved apparatus which science had installed as a permanent part of warship equipment since they were on the active list. The man-of-wars-man's instinct and aptitude is still with them, and in less than 24 hours the crews of the third fleet had settled down to their duties as if they had only just returned from six weeks' foreign service leave. There is another word which must be said in praise of the condition in which the men presented themselves at their ships and barracks on mobilization day. They were a great, sober, steady, purposeful body of disciplined men, and in one establishment where over 4000 men were received, four only, or one per thousand, had to be placed in the guard-room because they had too much liquor on board.—*United Service Gazette.*

THE KING LEADS HIS FLEET TO SEA.—The climax of the test mobilization was reached July 19, when King George inspected his stupendous fleet at Spithead. Steaming at 11 knots an hour, the imposing cavalcade was headed by the first battle-cruiser squadron, consisting of four ships in battle line ahead, under the command of Rear Admiral Sir David Beatty, who commands the squadron. The honor of leading the way was given to these dreadnought battle-cruisers—the *Lion, Queen Mary, Princess Royal,* and *New Zealand.* The battle-cruisers were followed by 29 ships of the first, second, third, and fourth battle-squadrons. These, the flower of the British Navy, came in two columns abreast. Admiral Sir George Callaghan (commander-in-chief of the home fleet) leading the way in the flagship *Iron Duke.* In the first battle-squadron was the *Marlborough* (flagship of Vice Admiral Sir Lewis Bayly), with a displacement and horse-power equal to those of the *Iron Duke* herself. Then came the *Colossus* and *Hercules,* the *Neptune* and *St. Vincent,* the *Superb* and *Collingwood.*

The powerful second battle-squadron came next, the *King George V* (flagship of Vice Admiral Sir George Warrender) being followed by the *Audacious, Ajax, Centurion, Orion, Conqueror, Monarch,* and *Thunderer,* all tremendous pieces of naval architecture of the most modern type, but showing variety in shape. The third battle-squadron brought before the notice of his Majesty ships of lighter tonnage, and, as things move so swiftly in naval matters nowadays, some experts say, almost out of date. These were the *King Edward VII* (flagship of Vice Admiral E. E. Bradford), which was launched at Devonport in 1903, and others built from nine to eleven years ago. Closely in their wake came the fourth battle-squadron, consisting of such fine specimens as the *Dreadnought* (flagship of Vice Admiral Sir D. A. Gamble), and the *Téméraire, Bellerophon,* and the *Agamemnon.* Other big ships, small ships, snakelike destroyers, and gunboats, and the almost myriads of tiny craft which go to make up Britain's first line of defence, came along from the westward, submitted themselves to the inspection of the King, and proceeded on their way. These were the vessels of the second and third cruiser-squadron, light cruisers attached to the different fleets, destroyers, and a regular swarm of small craft. Although the big ships for the most part steamed two and three abreast, the line was nearly 14 miles long, reaching from near Osborne to the eastern end of the Isle of Wight. Two hundred of the most complete sea fighters ever known; the greatest congregation of ships ever assembled had passed in review before the King, comprising 24 dreadnoughts, 35 pre-dreadnoughts, 18 armored cruisers, seven protected cruisers, and 78 destroyers, together with minelayers, repair ships, and all kinds of auxiliaries.—

REPAIR WORK OF THE FLEET.—The reorganization of the dockyards during the Fisher régime, and the stocking of these establishments with up-to-date plant is now bearing rich fruit and paying excellent dividends on the money so grudgingly provided by the Treasury for that purpose at Sir John's suggestion. The improved plant naturally makes for greater efficiency, and the rapidity with which repairs can be executed has also enabled the Admiralty to lay down the period of 28 days as a maximum of time for executing the smaller refits of ships temporarily withdrawn from the fighting line. These periodical or annual refits are distinct from the general overhaul and repair which ships undergo every four years while they belong to one of the first-line squadrons or flotillas. By this plan and by carrying out the smaller refits during the shorter days of the year the fleets are kept at their maximum strength during the summer months when all the principal gunnery and torpedo tests and other exercises and maneuvers are carried through. This routine has been made possible by the increased part that ships' artificers are made to play in the repair of their ships. As a contemporary has pointed out, whereas in the old time commanding officers employed ships' mechanics largely for private purposes and for beautifying their ships; nowadays logs recording the daily work of each man are kept and have to be produced at inspections, and during the time at sea and during refits in harbor or at the dockyards ships' mechanics have to be engaged at the legitimate work of their trades and not in beautifying the quarterdeck and batteries.—*United Service Gazette.*

THE EFFECT OF SEA POWER.—The value of sea power, which we have preached so long in the columns of the *United Service Gazette,* is now being brought home, both to our enemies and to ourselves, in a way little dreamt of by the vast majority of the present generation. The ramifications of its subtle power and influences are startling in their effects. How many have preached that if, and when, the Armageddon came we should be in a pitiful plight in a week. The shutters of our factories were to come down and the price of food go up, and the whole country was to be in such a plight in a fortnight, that the population would call upon its rulers to make any terms with the enemy to stay starvation in this country, since we never had more than a month's food in the United Kingdom. National grain stores, and a dozen other expedients, were advised to meet or mitigate such a state of affairs. Yet when the time arrives we find ourselves in practical command of the sea in a week, with our food routes open, our food at reasonable war prices, and with five months' food in the country at the outset, not counting the harvest now being gathered. And all this is secured to us by our fleet, while our opponents, rather than ourselves, are partly in the plight it was predicted we should be in. Such an object-lesson of sea power should for all time assure us such a fleet that no other power can equal. The man in the street has felt the protection of the fleet at his very door, no matter how remote from the sea his home may be. Sea power is writ large on the tradesmen's carts and on their bills.—*United Service Gazette.*

THE DOMINIONS AND WAR.—It is sad to reflect how little effective assistance the dominions are able to render us on the sea. They are making splendid offers of men who will strengthen the British military forces, and are placing an immense amount of food at the disposal of the British Government. Canada, in this respect is, in particular, distinguïshing herself. Misconceptions of policy with reference to naval defence, on the other hand, prevented any of the dominions rendering the measure of naval aid which they could have rendered if the emergency had been foreseen and suitable measures taken. The people of New Zealand can, however, congratulate themselves on the fact that their splendid battle-cruiser, given so freely to the service of the empire, was in its place in the main fleet when war opened. The Commonwealth Government, with fine patriotic instinct, immediately placed the ships in its possession at the complete disposal of the naval authorities. We do not doubt that the Admiralty immediately

issued orders for the disposal of these men-of-war to the best possible advantage of the empire generally. It would be unwise in the present situation to indicate the strategic policy which the Admiralty adopted. Canada and South Africa, having delayed so long to make any preparations, could assist hardly at all in defending British supremacy. The authorities at Ottawa did, however, the best that was possible in the circumstances, and immediately handed over to the Admiralty the two light cruisers *Niobe* and *Rainbow*, and did not hesitate to purchase out of hand two submarines which were on the eve of completion in the United States. The war will no doubt teach the British people many lessons, and it may be hoped that among these will be the importance of co-operative action between the various sections of the empire for the defence of the great maritime routes along which commerce passes.—*Naval and Military Record.*

CONDUCT IN WAR TIME.—*Powers of Naval and Military Officers.*—A supplement to the *London Gazette*, published August 13, contains an order in council sanctioning regulations for securing the public safety and the defence of the realm.

Under the general regulations it is provided that the ordinary avocations of life and the enjoyment of property will be interfered with as little as may be permitted by the exigencies of the measures required to be taken and that ordinary civil offences will be dealt with by the civil tribunals in the ordinary course of the law.

It is proclaimed lawful, where for the purpose of securing the public safety or the defence of the realm it is necessary to do so, for competent naval or military authorities (*a*) to take possession of any land and to construct military works, including roads thereon, and to remove any trees, fences, and hedges therefrom; (*b*) to take possession of any buildings or other property, including works for the supply of gas, electricity or water, and of any sources of water supply; (*c*) to take such steps as may be necessary for placing any buildings or structures in a state of defence; (*d*) to cause any buildings or structures to be destroyed or any property to be moved from one place to another or destroyed; and (*e*) to do any other act involving interference with private rights of property necessary for the purpose aforesaid.

Power is also given to the authorities to order the evacuation by the inhabitants of any neighborhood when it is necessary for naval or military purposes and to close premises licensed for the sale of intoxicants within or in the neighborhood of any defended harbor.

Further, the order prohibits persons from trespassing on railways and from loitering under or near bridges, viaducts, and culverts over which railways pass; and gives power of search, arrest, and trial by court-martial in cases where there is reason to suspect that premises are being used in a manner prejudicial to the public safety or defence of the realm.

Regulations specially designed to prevent persons communicating with the enemy and obtaining information for disloyal purposes and to secure the safety of the means of communication and of railways, docks and harbors; prohibit the publication or communication of information regarding the movements or dispositions of any of his Majesty's or his Majesty's allies' forces which might be directly or indirectly useful to the enemy; and the photographing, sketching, planning, and modelling of military and naval defence works; and the spreading by word of mouth or in writing of any reports likely to create disaffection or alarm among his Majesty's forces or the civil population. The regulations also make provision for the restriction of persons' movements and for the putting out of lights.

Any person contravening any of the provisions of the special regulations is liable to be tried by court-martial and to be sentenced to penal servitude for life or any less punishment; the penalty in cases of contravention of the regulations as to lights and movement being not more than three months with hard labor.

The competent naval or military authorities are commissioned officers

of the naval or military forces not below the rank of commander in the navy and lieutenant colonel in the army appointed by the Admiralty or Army Council to perform the duties of such an authority.

GREECE

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battle Cruisers					
Salamis	19,500	23	8 14-in., 12 6-in., 12 3-in.	Vulkan Works, Stettin	Laid down July, 1912
.....	24,000	21.5	10 14-in.	Saint Nazaire	Reported that negotiations have been completed for this ship.

ITALY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Giulio Cesare ...	22,022	22	13 12-in., 18 4.7-in.	Genoa	Trials April, 1914
Conte-di-Cavour	22,022	22	13 12-in., 18 4.7-in. 14 14-pdr.	Spezia	Launched Aug. 10, 1911
Leonardo da Vinci	22,022	22	same	Genoa (Odero)	Trials April, 1914
Andrea Doria...	22,564	23	13 12-in., 16 6-in.	Spezia	Launched March 30, 1913
Duilio.....	22,564	23	same	Castellamare	" April 24, 1913
4 ships	28,000	24	8 15-in., 16 6-in.	....	Will probably be laid down during spring and summer, 1915
Small Cruisers					
Basilicata	2,500	16.5	6 6-in.	Castellamare	Laid down Aug. 9, 1913
Campania	2,500	16.5	6 6-in.	"	" Aug. 9, 1913

NOTE.—Italy has about 15 destroyers and two submarines under construction.

JAPAN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Fuso.....	31,300	22.5	12 14-in., 16 6-in.	Kure	Launched Mar. 28, 1914
Fuso 2d.....	31,300	22.5	....	Kawasaki	Date when these ships will be laid down has not yet been settled.
Fuso 3d.....	31,300	22.5	....	Mitsubishi	
Fuso 4th.....	31,300	22.5	....	Yokosuka	Laid down Nov. 20, 1913
Battle Cruisers					
Hiyei.....	27,500	27	8 14-in., 16 6-in., 8 t. t.	Yokosuka	Commiss'd Mar. 31, 1914
Haruna.....	27,500	27	same	Nagasaki	Launched Dec. 14, 1913
Kirishima	27,500	27	same	Kobe	" Nov. 30, 1913

NOTE.—Japan has two destroyers and two submarines under construction in England and France respectively.

NORWAY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Small Cruisers					
Bjorgvin	5000	16.5	2 9.4 in., 4 6-in., 6 4-in.	Messrs. Armstrong	Laid down Jan. 8, 1913
Nidaros	5000	16.5	same	same	Launched June 9, 1914

NOTE.—Norway has four submarines under construction.

RUSSIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Sevastopol	23,026	23	12 12-in., 16 4.7-in.	Baltic Works	Launched June 29, 1911
Petropavlovsk.	23,026	23	same	" "	" Sept. 9, 1911
Poltava	23,026	23	same	New Admiralty	" July 10, 1911
Gangut	23,026	23	same	" "	" Oct. 7, 1911
Emperor Alexander III	22,435	21	12 12-in., 20 4.7-in.	Nikolaieff	" Apr., 1914
Empress Marie	22,435	21	same	Ivan Bunge Co.	" Nov. 3, 1913
Catherine II...	22,435	21	same	" " "	Laid down Sept. 1, 1912
Battle Cruisers					
Ismailia.....	32,200	28	12 14-in., 21 5.1-in.	Galerni	" Dec. 19, 1912
Kinburn.....	32,200	28	same	Baltic Works	same
Borodino.....	32,200	28	same	Galerni	same
Navarino.....	32,200	28	same	Baltic Works	same
Small Cruisers					
Adm. Butakow	7,500	32	15 5.1-in.	Putilow, St. Petersb.	Laid down Nov. 29, 1913
Adm. Spiridov.	7,500	32	same	" "	" Nov. 29, 1913
Svietlana.....	7,500	32	same	Neval	" Dec. 7, 1913
Adm. Grieg....	7,500	32	same	"	" Dec. 7, 1913
Muravjev Amurski	4,500	..	8 5.1-in.	Elbing	Launched Apr. 11, 1914
Adm. Nevelskoj	4,500	..	same	"	Laid down Feb. 13, 1913
" Lazarev...	7,500	32	15 5.1-in.	N. F. & W. Nikolaieff	" Oct. 19, 1913
" Nachimow	7,500	32	.....	R. S. Co. "	same

NOTE.—Russia has about 45 destroyers and 19 submarines under construction or contract.

SPAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Espana.....	15,450	19.5	8 12-in., 20 4-in.	Ferrol	Commiss'd Oct. 23, 1913
Alfonso XIII..	15,450	19.5	same	"	Launched May 7, 1913
Jaime I.....	15,450	19.5	same	"	Laid down Feb. 5, 1912

SWEDEN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Small Cruiser					
Sverige.....	7100	22.5	4 11-in., 8 5.4-in.	Gothenburg	Laid down Feb. 15, 1913

UNITED STATES

NEW BATTLESHIPS.—While there may be some new features in the battleships authorized by the last appropriation bill, they will represent no radical departure in construction or equipment. No attempt will be made to increase the speed, despite the agitation along this line in Europe, the naval authorities standing pat on their contentions that to increase the speed of a battleship it would be necessary to sacrifice its offensive or its defensive qualities. Of course, an effort will be made to increase the armor if it can be done without interfering with the speed of the ship. In order to fit into the organization of the best vessels of the fleet the three new ships must develop a speed of between 20½ and 21 knots. One of the chief reasons for disposing of the *Mississippi* and *Idaho* was their inability to make this speed. Although the Bureau of Ordnance some time ago prepared plans for a 16-inch gun, which plans can be used at any time the Secretary decides to increase the size of the guns on the battleships, it is not probable that this step will be taken in the construction of this year's program. The new ships will therefore carry the present type of 14-inch guns. This is regarded as one of the most powerful guns afloat, if not of the longest range. Nothing has happened in the construction of the navy of any other country to convince the Navy Department that the time is ripe for an increase in the caliber of the big guns of the navy. The 3-gun turret arrangement having proved a success, this arrangement of the new battleships' armaments will be followed. It is doubtful whether the ships could carry three 16-inch guns in one turret, and a change in the size of the gun would make it necessary to make some radical departures in turret construction. Of course, the new ships will be oil burners, and it is understood that they will be propelled by turbine engines. Mr. Daniels signed the contract plans for the new battleships on July 30. They will have a displacement of 32,000 tons, and will be named *California, Idaho,* and *Mississippi.* Of these new battleships two were provided for in this year's appropriation bill and the third will be paid for by the money obtained by the sale of the old battleships *Mississippi* and *Idaho* to Greece. Bids for the new vessels were sent out August 1. The bids will be opened at the Navy Department October 6, 1914. The vessels will have turbine engines and oil burning boilers of the water tube type. The dimensions and principal points of the new ships are as follows: Length over all, 624 feet; length between perpendiculars, 600 feet; breadth, extreme, 97 feet 4½ inches; draft, 30 feet; displacement, 32,000 tons; speed, 21 knots. Armament, main battery, twelve 14-inch guns; four submerged torpedo tubes; torpedo defence battery, twenty-two 5-inch rapid-fire guns.—*Army and Navy Journal.*

NEW TORPEDO-BOAT DESTROYERS.—The final step in completion of the design of the torpedo-boat destroyers for the U. S. Navy provided for in the naval appropriation bill approved June 30, 1914, was taken recently, when Secretary of the Navy Daniels signed the plans of these vessels as prepared under the supervision of the chief constructor. The Secretary

NAVY DEPARTMENT
BUREAU OF CONSTRUCTION AND REPAIR

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY, SEPTEMBER 10, 1914

Name, type and no. of vessels	Contractor	Per cent of completion Sept. 1, 1914		Aug. 1, 1914	
		Total	Per cent on ship	Total	Per cent on ship
Battleships					
36 Nevada	Fore River S. B. Co.	73.3	66.0	72.4	64.4
37 Oklahoma	New York S. B. Co.	74.1	71.7	72.6	69.8
38 Pennsylvania	Newport News S. B. Co.	47.2	37.3	42.0	33.4
39 Arizona	New York Navy Yard	29.2	22.4	24.4	19.1
Destroyers					
45 Downes	New York S. B. Co.	95.3	95.3	95.3	95.3
51 O'Brien	Wm. Cramp & Sons.	83.0	80.9	79.0	76.8
52 Nicholson	Wm. Cramp & Sons.	80.2	77.8	73.3	70.5
53 Winslow	Wm. Cramp & Sons.	73.5	70.3	71.5	68.4
55 Cushing	Fore River S. B. Co.	62.2	58.0	56.1	51.1
56 Ericsson	New York S. B. Co.	82.0	81.6	76.9	76.5
57 Tucker	Fore River S. B. Co.	14.6	7.7	12.6	6.1
58 Conyngham	Wm. Cramp & Sons.	19.8	14.6	11.1	4.6
59 Porter	Wm. Cramp & Sons.	12.3	5.5	9.0	2.5
60 Wadsworth	Bath Iron Works.	57.0	53.7	48.4	44.3
61 Jacob Jones	New York S. B. Co.	23.8	20.5	14.9	6.8
62 Wainwright	New York S. B. Co.	21.4	18.1	14.4	6.3
Destroyer Tenders					
2 Melville	New York S. B. Co.	62.8	60.8	59.7	57.3
Submarines					
26 G-4†	American Laurenti Co. (Phila.)	96.4	95.5	96.4	95.5
27 G-2*	Lake T. B. Co. (Bridgeport).	89.7	89.7	89.7	89.7
31 G-3*	Lake T. B. Co. (Bridgeport)	83.0	82.6	82.3	81.9
34 K-3	Electric Boat Co. (Seattle)	99.0	99.0	98.1	98.1
35 K-4	Electric Boat Co. (Seattle)	99.0	99.0	98.8	98.8
36 K-5	Electric Boat Co. (Quincy)	Del'v'd	8-20-'14	98.8	98.8
37 K-6	Electric Boat Co. (Quincy)	99.5	99.5	98.8	98.8
38 K-7	Electric Boat Co. (San Fran.)	94.7	94.7	94.3	94.3
39 K-8	Electric Boat Co. (San Fran.)	94.8	94.8	94.3	94.3
40 L-1	Electric Boat Co. (Quincy)	55.5	49.5	49.3	43.6
41 L-2	Electric Boat Co. (Quincy)	55.7	49.5	48.2	42.0
42 L-3	Electric Boat Co. (Quincy)	53.8	46.7	47.3	40.9
43 L-4	Electric Boat Co. (Quincy)	53.1	45.9	46.6	40.1
44 L-5	Lake T. B. Co. (Bridgeport)	34.0	28.6	28.9	24.8
45 L-6	Lake T. B. Co. (Long Beach, Cal.)	33.7	29.0	28.1	24.0
46 L-7	Lake T. B. Co. (Long Beach, Cal.)	33.0	28.0	27.6	23.9
47 M-1	Electric Boat Co. (Quincy)	38.7	32.9	33.1	27.4
48 L-8	Portsmouth, N. H., Navy Yard	0.0	.....	0.0	.....
49 L-9	Electric Boat Co. (Quincy)	14.9	8.8	12.3	6.0
50 L-10	Electric Boat Co. (Quincy)	14.6	8.5	12.3	6.9
51 L-11	Electric Boat Co. (Quincy)	0.0	0.0	.....	.....
Submarine Tenders					
1 Fulton	New London S. & E. B. Co. (Quincy)	90.6	90.6	81.4	80.6
2 Bushnell	Seattle Construction & D. D. Co.	52.9	44.8	47.3	39.4
Fuel Ships					
13 Kanawha	Mare Island Navy Yard	75.0	74.4	71.2	70.6
14 Maumee	Mare Island Navy Yard	41.9	40.2	35.4	30.9
Miscellaneous					
Supply Ship No. 1	Boston Navy Yard	0.0	.....	0.0	.....
Transport No. 1	Phila. Navy Yard	0.0	.....	0.0	.....
Pan. Canal Colliers					
Ulysses	Maryland Steel Co.	42.2	35.8	34.6	25.5
Achilles	Maryland Steel Co.	37.6	28.0	30.8	20.0

*Contracts forfeited, vessels being completed New York Yard.
†Conditionally delivered at Philadelphia Yard, January 22, 1914.

has also signed and issued a circular inviting all shipbuilders who have sufficient plant to construct these vessels to submit competitive bids for their construction in accordance with the plans and specifications approved.

The final design of these vessels was developed by the Bureaus of Construction and Repair and Steam Engineering to produce certain important military characteristics desired by the General Board of the Navy. The design will be, in general, similar to that of the preceding class, and will differ from the latter principally in the substitution of triple for twin torpedo tubes. The vessels will have the same high sustained sea speed and radius of action at high speed that have been provided in previous boats of the same class in the U. S. Navy.

These destroyers are now designated as desroyers *Nos. 63, 64, 65, 66, 67* and *68*. The Secretary will, however, at an early date select the names of six deceased officers of the navy whose distinguished services or heroic acts have entitled them to places on the navy's roster of honor of torpedo-boats and destroyers in the active service of their country.

The main characteristics of these vessels will be: Length, 310 feet; beam, 29 feet 10 inches; draft, 9 feet 6 inches; displacement, 1108 tons; battery, four 4-inch rapid-fire guns and four triple torpedo tubes; machinery, steam turbines, oil fuel burning water tube boilers.

The plans, specifications and advertisements for the vessels were issued about September 5, and bids will be opened by the Secretary of the Navy on November 10, 1914. The Secretary has directed the Mare Island Navy Yard to submit estimates for the construction of vessels of this program.

SUBMARINES' LONG VOYAGE.—The cruisers *South Dakota* and *West Virginia*, each with a submarine in tow, sailed from San Francisco, July 23, for Honolulu, a distance of 2200 miles. This is said to be the longest towing voyage ever attempted by submarines, and it will therefore be watched with especial interest. Careful precautions were taken to provide towing apparatus that would readily take up the slack and sag of the cable in heavy weather.—*Scientific American.*

COLLIER "JUPITER."—The new U. S. naval collier *Jupiter* recently made a three-day successful trial cruise along the California coast to test her electrical propelling machinery furnished by the General Electric Company. With her engines working perfectly the *Jupiter*, on the four hours' speed trial, was driven at the rate of 15.1 knots, and during the 20-hour endurance run the vessel maintained a speed of 14.9 knots. The officers of the collier stated that the results were fully up to the requirements. The *Jupiter* is now preparing to come to this coast via the Panama Canal.—*Marine Journal.*

LAUNCH OF THE "NICHOLSON."—The United States torpedo-boat destroyer *Nicholson* was launched from the Cramp shipyard in Philadelphia, August 19. Captain Samuel Nicholson, after whom the boat is named, served in the Revolutionary War and was the first commander of the frigate *Constitution*. The destroyer is the twelfth vessel of its type to be constructed for the government by the Cramps. It is built of steel and is 315 feet long, 30 feet 6 inches beam and has a draft of 9 feet 4½ inches. It will be propelled by twin screws driven by turbine engines and the contract speed calls for 29 knots an hour. The *Nicholson* has a battery of four 4-inch guns and four twin-deck torpedo tubes.—*Boston Evening Transcript.*

PEARL HARBOR DRYDOCK.—The Secretary of the Navy will shortly approve the plans for the completion of the Pearl Harbor drydock. The last appropriation bill carried $1,500,000 as an increase on the limit of cost of the dock, bringing the total up to $4,986,500. It is proposed to construct the dock on entirely new plans which it is thought will overcome the local conditions. It will be built of cement in sections of between 60 and 70 feet.

After the sections are moulded they will be sunk and joined together under the water. This style of cement work has been used in the construction of walls, but never in building drydocks. It is estimated that it will require two years to complete the dock. The power plant has been completed and the work of construction of the coaling plant and the fuel oil depot is in progress.—*Shipping Illustrated.*

ORDNANCE AND GUNNERY

FRENCH BATTLESHIP AIR CUSHION DEFENCE AGAINST SUBMARINE ATTACK.—The five quadruple-turret ships of the *Normandie* type (25,300 tons, 12 guns of 13.4-inch, 21.5 knots), so truly remarkable in the matter of armament, realize also a series of innovations in what concerns defence against submarine explosions. With a view to testing the latter, a caisson reproducing the air cushion and the hollow armored longitudinal wall of the *Gascogne* was fitted, at Lorient, on the side of the old battleship *Devastation*, and a full torpedo charge exploded against it on July 10, with the result that the ship listed some ten degrees, which, pending official investigation, is considered more satisfactory than previous similar experiments with caissons intended for the *Henry IV* and *Mirabeau*. Useful data are certain to be collected that will be utilized for the *Tourvilles*, in which it was from the first intended to give special attention to submarine protection.—*Naval and Military Record.*

GERMAN REALISTIC GUN PRACTICE.—The frequency with which the German Navy engages in realistic gun practice against obsolete armored ships is well known. According to the *Tägliche Rundschau*, the four old vessels of the *Sachsen* class have proved most satisfactory for this purpose. The class consists of the *Sachsen, Bayern, Württemberg*, and *Baden*. The displacement is 7300 tons; the length 298 feet. For about one-third of the length there is a belt of 16-inch compound armor, above which rises the citadel protected by 9¾-inch plates. The original armament was six 10.2-inch B. L., two of which were mounted in an open barbette and four in the citadel. Before one of these old ships is taken out to be fired at it is fitted here and there with modern armor-plating, and certain of the vital fittings of a modern man-of-war are reproduced to ascertain their probable fate when subjected to bombardment. In this connection it is rumored that creditable imitations of the typical British fire-control station have been mounted on the masts of certain German target ships. The utmost care is taken to ensure that the ship remains afloat after the firing. The hull is packed with cork and other buoyant material, whilst to guard against total loss the vessel is moored, when possible, in shallow water. When the practice is over a party of experts at once proceeds on board to examine the effect of each hit, and the dockyard staff immediately plugs the shot holes and carries out what repairs are necessary to enable the vessel to be towed safely home. On arriving in port she is taken in hand to have all damage made good, and in due course emerges again to undergo another ordeal by fire. Ships can thus be used several times over, though it is obvious that there is a limit to their usefulness, for the shattering effect of modern shells must weaken the structure as a whole, and in time damage it beyond repair. It is not merely to test the effect of projectiles against armor, etc., that these bombardments are periodically carried out in the German Navy. Experience has proved that the strongest lath and canvas target cannot profitably be used for gun practice in thick or heavy weather. At long range it is too small to be seen, and in a seaway is useless. Target ships, on the other hand, offer an excellent mark in any weather, and are particularly suited to long-range practice. Every hit can be observed. They cannot, of course, be towed so fast as ordinary targets, but this is about their only disadvantage. From time to time old torpedo-

boats are used up in the same way. The German Navy has a large reserve of obsolete ships, and the heavy vote in the annual budget for fitting them out as gunnery targets shows that this sort of practice is considered to be exceedingly valuable.

A COMBINED BOMB AND ARROW.—M. Guerre, the inventor of an explosive projectile for destroying aircraft in the shape of a combined bomb and arrow, made some interesting trials of it from the Solferino Bridge in Paris. The projectile consists of a small and very light bomb with a very sensitive detonator which can be set just before throwing. In the rear of the shell or head is a guiding piece with "feathers," resembling a short arrow. Several of the projectiles were thrown from the bridge down on a bed of sand on the quay, and they took fire at once, exploding at the same time. Such a bomb would no doubt do great damage to an airship, and it is well adapted for use in an attack of aeroplanes upon airships, for instance.—*Scientific American.*

RUMOR OF GERMAN TORPEDO DEVELOPMENT.—Unless rumor errs, the Germans have lately produced a new type of torpedo which has a maximum speed of 52 knots, and a war-head sufficient to settle the biggest capital ship at one blow. As far as is known, however, it has not yet been issued to ships.—*Naval and Military Record.*

ITALIAN EXPERIMENTS.—Italy is early in the field with experiments to test the system of under-water protection for the bottoms of surface warcraft. There are few old hulls in the Italian Navy which can be used for such purposes, so caissons, representing three different systems of sub-division, had mines placed beneath them and exploded. This method was an economical one, because not only was there the saving of expense in raising an old warship hulk, if the experiment sank her, but a mine was used instead of an expensive Whitehead torpedo, and the mine was equally effective in giving the data required by the authorities. Naturally the result of these experiments will not be communicated to the world at present, but it will be flattering to the Italian nation to learn that Naval Constructor Rota has designed a method of under-water protection that gave good results in the experiments carried out at Spezia to determine the best kind of resistance to submarine explosion.

USE OF MINES IN RUSSO-JAPANESE WAR.—No more eloquent testimony of the part played by mines in the Russo-Japanese war could be sought than the appended list (based on the official history of the conflict) of losses sustained by both sides from this cause up to the fall of Port Arthur. If the Germans in the present war are employing mines as freely as is believed, the people of this country must be prepared to face losses equally heavy with equanimity. The action of the *Königin Luise* in laying mines outside territorial waters had its precedent in the Russo-Japanese war, but there were not a few criticisms of the action of both sides, at that time and subsequently, when merchant vessels continued to strike mines for quite a long time after peace had been concluded. It is true the Chinese were the chief sufferers, but some European vessels also fell victims to the casual ways of the combatants in strewing mines broadcast without any provision for their being rendered harmless if they broke loose. It is sincerely to be hoped that we shall not have a similar experience after the conclusion of the present struggle.

List of Russian Ships Lost by Mines, 1904-5

Yenesei (armed minelayer), by own mines, February 11, 1904.
Boyarin (light cruiser), by Russian mine, February 14, 1904.
Petropavlovsk (battleship), by Japanese mine, April 13, 1904.

Torpedo-boat *No. 208*, by Japanese mine, outside Vladivostok, July 17, 1904.

Gremyashchi (armored gunboat), near Port Arthur, August 18, 1904.

Vuinoslivi (destroyer), near Port Arthur, August 24, 1904.—*Naval and Military Record.*

BOTTOM ARMOR FOR BATTLESHIPS.—In a paper on the protection of battleships against submarine attack Prof. Sir John H. Biles suggested that as a result of the reduction of weight, due to the use of oil and turbines, "it may be that armor may to some extent be sacrificed, and gun attack be allowed to be more effective in order that some compensation should be available for the effect of torpedo attack. It will thus be seen," he said, "that the increasing destructive effect of the torpedo brings into the battleship problem the possibility of changes which may once again revolutionize warship design. . . . . Some of us have lived to learn the limitations of these cheap methods of destruction, and before too rapidly breaking up our battleships and building no more of them, it may be well to consider what, if any, defence can be given to these poor helpless ships. A distinguished gunner told you in this institution in April that a modern battleship will be destroyed by gun fire in five minutes after fighting range has been reached. The submarine officer will tell you he can get a torpedo into any ship that he can see and can get within the range of his torpedo. The battleship can hit back at her enemy battleship, but can do nothing by herself against the submarine.

"What is the liability to be hit in the two cases? Can the submarine find the battleship as surely as the enemy battleship can? In other words, what is the relative liability to be hit by the two methods of attack? This is for the naval officer to tell us, if he can. If the relative liability to be hit is sufficiently great to warrant full consideration of the relative damage, we shall also want to know this. Assuming, as one reasonably may, that very serious damage will be done by the explosion of a torpedo, the next question is, What can be done to prevent or seriously reduce this damage? Sub-division naturally suggests itself as one means of minimizing the effect of this damage, but, when all that is possible in this direction has been done, there seems to be no great certainty that a battleship will be still a formidable fighting machine after having received the successful contact explosion of a 21-inch torpedo. Can we do anything in addition to sub-division to preserve the ship for effective fighting purposes?"

Professor Biles holds that the effective advent of the submarine seems to justify a serious consideration of the question of applying armor to the bottom of ships, which would reduce the speed of a 25,000-ton battleship by two knots. Lord Brassey declared that "it was obvious that Great Britain could not afford to accept any inferiority in guns, in armor, or in speed or coal endurance as compared with other nations. It seemed to him that the problem would have to be solved by placing the armament in a greater number of ships. That would be a costly change to effect, but he submitted that in naval defence economy was not the first consideration."—*Army and Navy Journal.*

THE WHITEHEAD TORPEDO.—As an indication of the way in which the Whitehead torpedo is gaining ground as a naval weapon, both for attack and defence, it may be pointed out how rapidly both the public and private establishments are growing in the United Kingdom, where these lethal weapons are built up and tested. The State manufactory had, only a few years ago, to be transferred from Woolwich, where it had outgrown its quarters, to a yard prepared for the work on one of the Scotch Locks near Greenock, where upwards of 1200 men are now employed. The large private establishment at Portland is also to be enlarged at an early date by the addition of a torpedo range in Weymouth Bay, the present range in Portland Roads not being sufficiently long for testing the latest tor-

pedoes. Opposition to the new range from the local steamship owners may be forthcoming, as it will cut across the channel they use, but the Admiralty are at the back of the company, apparently, and so the latter may win. The increase in the number of Whitehead torpedoes now demanded by the fleet is accounted for by the rapid way in which our destroyer and submarine flotillas are being expanded; and this increase is likely to continue as this expansion goes on, for the number of torpedoes to arm them on active service, and to be kept in reserve, will grow pro rata. Meantime the new dreadnoughts, with their all powerful guns, do not carry fewer Whiteheads than their more lightly gunned predecessors. The improvement, during late years, of the Whitehead torpedo has made it a very reliable and formidable weapon.—*United Service Gazette.*

NAVIGATION

WARSHIP COLLISION.—*£2650 Damages Against Centurion's Navigating Officer.*—Actions arising out of a collision in the Channel between the battleship *Centurion* and the Italian steamship *Derna* on December 10, 1912, were heard by Mr. Justice Avory and a special jury in the King's Bench Division recently.

The plaintiff was Marie Adelaide Inez Giovanni Capelli, who sued Lieutenant Hector Boyes, navigating officer of the *Centurion* at the time of the collision, for damages for the loss of her husband, who was second engineer in the *Derna.*

Mr. F. A. Greer, K. C. (for the plaintiff), said it was not in dispute that the *Centurion* was being negligently navigated at the time of the collision. Every one of the crew of the *Derna* was drowned. The plaintiff, who was married only in the previous February, was absolutely dependent on her husband's earnings. His wages were 300 lira, or £12 a month, and as he held a chief engineer's certificate, in 1913 he would, if he had obtained such a berth, have received the trade union wage of 500 lira a month, or £240 a year.

The jury awarded the plaintiff £500 damages, and his lordship entered judgment accordingly, with costs.

In the second case the plaintiff was Mrs. Rosa Oneto Schiaffino, widow of the captain of the *Derna.* There were seven children, none of whom were earning their own living.

The jury awarded her £2150 damages, £1000 to the widow and the rest to the children.

Judgment was entered accordingly, with costs, and the usual order for the investment of the money for the children.

It will be remembered that the *Centurion,* battleship, which was built at Devonport, was running her official trials when the collision occurred which resulted in the loss of the *Derna,* an Italian steamer, and all her crew.

CAPE COD'S TOLLS OF LIVES AND SHIPPING.—Estimates show that during the past half century or more some 2000 ships have been lost while navigating around Cape Cod in the winter time, and that the loss of life has been from 700 to 800 persons. It is no wonder, then, that the opening of the Cape Cod Canal on July 29, which makes an island of that sandy arm stretching out into the sea as if to warn the mariner of the menace that it is to him, was an event of unusual importance in shipping circles. For two centuries navigators of the New England coast have realized the need of this waterway, but the Federal Government left it to private enterprise to construct it. Aside, however, from providing a safe passage for coastwise shipping in navigating from Southern to New England ports, this canal has

importance in being a link in the intercoastal waterway that is being urged by shipping men to parallel the Atlantic coast from Maine to Florida, hence the time may come when the Federal Government will be obliged to take it over and make it part of the great national water highway that will facilitate the transportation of commerce along this coast and save annually many valuable human lives and much floating property.—*Scientific American.*

ENGINEERING

MOTOR-DRIVEN BATTLESHIPS.—The shadow of the coming motor battleship had been cast before for such a long time that some people began to think that this shadow would never develop into substance before the submarine had driven the "mammoth monsters" from the sea. But the thickening of the shadow to the consistency of substance is now in a more rapid state of development, for the Italians are about to build a group of four battleships on the general plan of our *Queen Elizabeth*, and in these latest works of marine science the motor is to appear. The Italian designers have decided to introduce a three-shaft arrangement into the machinery of this group of capital ships, the wing screws being driven in the ordinary way by steam turbines, while the center shaft will be operated by a 12,000 horse-power Diesel engine. So not only is there to be the novelty of a motor-driven screw for propelling a battleship, but the abnormal power of the Diesel engine shows a big leap forward in the development in this sort of propulsion for marine work. The armament of these ships is to be extraordinarily heavy, for eight 15-inch—possibly 16-inch—guns are to be mounted as a primary armament, with sixteen 6-inch as a secondary battery. The vessels will be 629 feet long, 26,000 tons displacement, and the designed speed, using oil-fuel exclusively, 25 knots. The speed of the first battleship to use motors for her propulsion is, therefore, to be a couple of knots faster than the best of the present type, driven entirely by steam.—*United Service Gazette.*

BATTLESHIP OR SUBMARINE? THE FIRST STEP.—This subject found a place on the agenda of the meeting of the Institution of Naval Architects, recently held at Newcastle-on-Tyne, where, so great an authority as Sir John Biles, the well-known professor of naval architecture at the University of Glasgow, put forward the following points for the consideration of the meeting:

(1) Is four-inch armor sufficient protection against torpedoes to justify its adoption in the latest type of battleship?

(2) Has the submarine become such a menace as to justify the adoption of four-inch armor protection for the bottom of battleships?

(3) Is the submarine menace of sufficient importance to justify the building of smaller, slower battleships, say of 16,000 tons displacement, and 18 knots' speed, having six heavy guns each, instead of eight or ten in the larger ships?

(4) Is the method of applying armor to the bottom of large vessels of sufficient value in itself to justify the adoption of a form of ship which will offer more resistance than the ordinary form?

It must be admitted that this is a series of searching questions, each and every one highly important in considering the question of battleship *vs.* submarine. To take the questions seriatim, our answer to the first would be that if sufficient data from practical experiment is not available for experts to settle this point, then we have old warship hulls whose bottoms can be covered with four-inch armor plates, and we can well afford to use one of our latest Whitehead torpedoes to fire at the armored bottom of the ship so fitted, and placed where she can, if necessary, be easily salved and the extent of the damage ascertained. (2) As to whether the submarine has become such a menace as to justify the adoption of 4-inch armor?

We should certainly say that if it is found that 4-inch armor gives effective protection to ships' bottoms against the latest torpedoes, then the time has arrived for armoring the bottoms of surface craft, even if the speed is reduced. The submarine is developing at such a pace that its possibilities are beyond conjecture at the present moment, and it would be better to have safety first than speed in surface craft. Speed is good, but security is better, and surface craft with armored bottoms will always be speedier than submerged submarines, and will therefore always have the means of escape from them when their (the submarines) approximate position is known to those in command of the battleship or cruiser. There are other factors to be considered in all the replies we are setting down, but these are the main factors so far as we can see them at first sight.

Then in respect to (3) we should certainly say that, in any case, it is worth while to build smaller, even if slower, battleships, of dimensions not exceeding 16,000 tons, and carrying no more than six primary guns of large caliber. As to whether these should be 12-inch or larger guns, the question arises whether it is worth while mounting larger guns on board our battleships than are needed to penetrate the thickest armor that can be obtained in the market at the longest range at which a gun can be fired with accurate aim, mounted about 35 feet above the waterline. If 12-inch guns can do this, then it would surely be an unnecessary expense to use larger weapons. Anyhow, it would appear that the size of the gun can be governed by these conditions. Thus the gun, be what size or power it may, is limited in practice to the range at which an object the size of a battleship can be sufficiently seen to be attacked by guns mounted on board ship. Our readers well know we have always been consistent advocates for medium size in battleships, and about 16,000 tons has always appeared to us to be desirable dimensions. We find that several members of the meeting at Newcastle, as well as Lord Brassey, also hold these opinions. That this view is being more largely entertained as time passes and the weaknesses of super-dreadnoughts are being more and more debated and discovered, is evidenced by what the Spaniards are doing. Spain is building up a modern navy, and the first battleship to be delivered to King Alfonso's Government, at an early date, is the *Espana,* which, on a displacement of 16,000 tons, is to carry eight 12-inch guns, besides twenty 4-inch weapons, and the speed of this vessel, on trial, exceeded 20 knots. The main guns are behind 10-inch armor and the 4-inch gun battery is shielded by 6-inch armor. These figures speak for themselves, and convince us that to revert to 16,000-ton dimensions, with armored bottoms, if only for one homogeneous squadron of eight ships, would be a wise step.

As to the reply to (4) of Sir John Biles' questions, we should say that the application of armor which would resist torpedo attack, certainly up to 4-inch plates, on the bottom of battleships, would be of sufficient value to justify the building of a complete squadron of fighting ships of this description. If they proved to be successes, then the whole world would probably follow us in sacrificing a certain amount of speed to acquire greater safety for their capital ships, and we should once more have given the nautical nations a lead. If, on the other hand, the advantage was not found to be as great as predicted, we should only have committed ourselves to one squadron of this type, and this squadron would be of peculiar use, with their armored bottoms, in the Channel and in the narrow seas, where the submarines of our enemies would be most likely to be found. At first we should proceed tentatively, and we should soon discover if smaller battleships were the worst to which the submarine would drive us, or if it were only the first step of clearing the ocean of battleships.—*United Service Gazette.*

LESSONS OF THE RUSSO-JAPANESE WAR.—A speaker at the meeting of the Institution of Naval Architects spoke strongly in favor of an increased provision of internal bulkheads. Admiral Sir Reginald Custance reminded the meeting of incidents in the Russo-Japanese War. After three actions

between 200 and 300 torpedoes were found. Of that number only 5½ per cent made effective hits, and of these 3½ per cent were made upon ships either anchored or not in motion, and no vessel went to the bottom as the result of being struck by one torpedo. The Marquis of Bristol, the president, nevertheless urged, as a gunnery officer, that it was the duty of the Admiralty to carry out experiments to ascertain whether the gain of protection due to armor on the bottom would be worth the loss of speed. Curiously enough, none of the speakers referred directly to the influence which the increase in the speed of battleships and cruisers is likely to have upon the effective operations of submarine craft. Judging by his remarks, Sir Reginald Custance has come to the conclusion that speed is in itself a good defence against the submarines. Since the war in the Far East we have been building battleships with a speed of 4 or 5 knots greater than that of the battleships and large cruisers which fought under the Russian and Japanese flags. Owing to the adoption of oil the speed of the British ship is still advancing. The battleships of the *Queen Elizabeth* class, it is anticipated, will steam as fast as the largest destroyer in an average seaway and will be twice as swift as any submarines now in commission, even when travelling upon the surface. Whatever advantage armor protection under water might confer, we can hardly afford to ignore the protection which the latest ships are attaining owing to their capacity for steaming at high rates. It is a nice question, in view of the experience in the Russo-Japanese War, whether the exchange of 2 knots or so of speed for a gain of 4 inches of armor protection is one worth making. The meeting at Newcastle-on-Tyne, which was attended by some of the most distinguished naval constructors in the country, shed no light on this matter. It may be hoped that the Admiralty is not ignoring the importance of this question, and that experiments, however costly, will be carried out as suggested by the Marquis of Bristol.

THE SMALL BATTLESHIP.—Lord Brassey has always been an advocate of battleships of moderate displacement, and the success of British firms in designing such ships for foreign customers is likely to direct attention once more to this subject. The Elswick and Armstrong firms, for instance, have just completed the first of three battleships for the Spanish Navy. The *Espana* has realized a speed of 20 knots and has passed through her gun trials with complete success. This ship, on a displacement of about 16,000 tons, carries eight 12-inch guns, twenty 4-inch quick-firing weapons, and has three submerged torpedo tubes. The main armored belt has a maximum thickness of 9 inches, tapering off to 4 inches; the vessel possesses a protective deck of 2¾ inches, with 6 inches of armor on the side above the belt. The main guns are behind 10 inches of armor, and the anti-torpedo battery is mounted behind 6 inches of armor. At a moderate cost Spain is obtaining ships of high potential value, which can carry as much as 11,900 tons of coal. The design is not perfect, but it will be conceded that the British firms concerned have achieved a wonderful result on an exceedingly moderate displacement. Another illustration of what can be done on an exceedingly small displacement is illustrated by the first of two Norwegian battleships which have just been launched at Elswick. These ships will be slow, but for their size they will develop enormous power. They are of 4825 tons displacement, and have a length of 310 feet over all, or 290 feet between perpendiculars, a breadth moulded of 75 feet, depth of 26 feet, and a draft of water of 26½ feet. They will be turbine driven, the machinery being supplied by Messrs. Hawthorn, Leslie & Co. The designed speed is 15 knots. Protection is afforded by a belt of side armor 7 inches thick, tapering to 4 inches, while the barbettes have armor 8 inches thick, and there is 4-inch armor on the citadel. There is also deck protection of 2 inches in thickness. The armament consists of two 9.4-inch, four 6-inch, and six 4-inch guns, all of 50 caliber. The 9.4-inch guns are mounted in armored gun-houses, one forward and one aft, and the 6-inch are also

single mounted. Machine and boat guns are carried, and there are two submerged tubes for discharging 18-inch torpedoes. Of course, such vessels as these would be useless in the British Navy, but a proposal that, over and above the forecasted program of construction, during the next few years we should lay down eight ships of moderate size for inshore work is one which will perhaps be usefully discussed. The objection is that small ships result in a long battle-line, and that for the same power that the big ships represent the corresponding vessels of moderate displacement represent very heavy maintenance charges. Small ships, owing to their relatively large crews, are very costly.—*Naval and Military Record.*

AVIATION

AEROPLANES AND "ZEPPELINS."—*Zeppelins* have been shown to be less fearful in their effects than even a single field piece. They have done nothing that an aeroplane could not do better, and, presenting an admirable target, several have been already sunk by the gun-fire of the Allies. As for bomb dropping, it has been shown to be wholly insignificant in its power of destruction, as much from a *Zeppelin* as from an aeroplane, and is no longer the dreaded thing it was. If more serious attacks should be attempted by the remaining *Zeppelins* that Germany possesses they will be met as those already made have been met or, as a last resort, by the concerted action of a handful of aeroplanes. There can be no doubt that a few desperate pilots who were willing to throw their lives away could successfully ram and destroy any airship that has ever sailed. Their speed and maneuvering powers are far greater than those of the *Zeppelin,* and such guns as the latter carry would find the greatest difficulty in bringing down every one of a covey of aeroplanes before one had got sufficiently close or into such a position as to ram with certainty. It is becoming more and more abundantly clear that as far, at any rate, as the present war is concerned, the function of the fourth arm is not offensive. The great duty which the aeronaut can perform is to spy out the enemy's position, and in doing this he is no doubt rendering signal service. For this work the aeroplane is better than the airship in every respect save one. It is less visible, it is faster, it is a smaller target, it carries fewer men, it is readily transportable, requires no gas plant to charge it, costs but a fraction of the price of a *Zeppelin,* and finally can fly at a higher altitude. It suffers only from the fact that it cannot remain at rest in the air; but this is a very small disadvantage when set against the many that the airship presents. To sum up, whilst the aeroplane has done brilliant work during the last three weeks the *Zeppelins* have proved a hopeless failure.—*The Engineer.*

NEW ALTITUDE RECORD WITH AN AEROPLANE.—On July 9, at Johannisthal Aerodrome, near Berlin, Germany, Otto Linnekogel soared to a height of 21,654 feet, or 4.1 miles in his monoplane, said to be the highest altitude record yet attained by an aeroplane.—*Scientific American.*

FINS ON FRENCH MACHINES.—The question of spiral stability is receiving some attention from French designers. Our Paris aeronautic correspondent, Mr. John Jay Ide, tells us that the new army *Morane-Saulniers* are all fitted with a vertical fin forward of the rudder. No doubt a fin was found desirable on the *Moranes* on account of the fairly great amount of side area forward. R. Esnault-Pelterie was one of the first designers who realized that tail fins were desirable. His 1909 machines were fitted with them.—*Scientific American.*

GERMAN NAVAL DIRIGIBLE.—At the moment only one naval dirigible is completed, this being the *L 3,* which accomplished her maiden flight on May 16 last. The following particulars of this air cruiser are now avail-

able. It is of the *Zeppelin, i. e.,* rigid type, and was laid down at the beginning of this year. The length is 518 feet, greatest breadth, 47 feet 9 inches, depth 62 feet 4 inches. The gas capacity is 23,000 cubic meters. Three Maybach motors, each of 200 h. p., are fitted, giving a total of 600 h. p., and a speed of 47 miles an hour. Each wing motor operates one propeller, but the middle motor is geared to drive two. The guaranteed altitude is 8200 feet, and the "useful weight" that can be carried is 8400 kg., or nearly 8½ tons. Since being taken over by the naval authorities this airship has made two notable flights. On May 16 she rose to a height of 10,250 feet, at which time there were 17 persons on board. On May 21-22, she made an endurance flight of 34 hours, with the motors working throughout, and came to earth with a good supply of benzine still in the tanks. Other dirigibles of still larger size and increased power are completing and building. *L 3* is obviously a most formidable craft, regarded either as a scout or a bomb-carrier. Under reasonable atmospheric conditions she would be perfectly able to carry out long-distance flights for the purpose of delivering an attack on enemy's dockyards, and the remarkable weight-carrying power gives an idea of the quantity of explosives she can store in her magazines. It is possible this aerial warship will be surpassed in size and speed by the British rigid dirigible which *Nauticus* states is building at Barrow, but in the meantime the German Navy is unique in its possession of this formidable aerial auxiliary.—*Naval and Military Record.*

PROTECTION FOR AIRCRAFT.—A very serious question has arisen in respect to the provision of adequate protection for service aeroplanes, seaplanes and airships at the many aerial stations that are now being built in every part of the country, and especially along the sea coast. Obviously, they will be the objects of early attack by those hostile airmen who can break through our own aerial patrol. The present housing accommodation consists of huge corrugated iron structures which stand out as prominent landmarks on the countryside, and can be distinguished miles away, especially by men in elevated positions such as aerial scouts would occupy. Once spotted, their doom would be sealed, as fixed objects are comparatively easy to hit—as has been proved by experienced bomb-droppers—unless the enemy is driven off by guns mounted at aerial stations for that purpose. At present our aerial centers are for the most part insufficiently protected in this way, and are therefore open to attack. But in any case we ought to have disappearing structures, which could, by means of electrical or hydraulic apparatus, be lowered to the ground level, further protecting them by having their tops covered by means of armor plates of adequate thickness to secure bomb-proofness. These armor plates could be mounted and manipulated on tramways laid for the purpose. The very act of lowering them level with the ground would be a great security, as it would be difficult for airmen to detect them, at the altitude they would have to keep, if the tops of the sheds were painted to fit in with the local surroundings. Their prominence at the present moment invites attack and certain destruction.—*United Service Gazette.*

IMPROVING THE EFFICIENCY OF BRITISH NAVAL AIRCRAFT.—There are signs that the naval authorities now consider the naval air service to have advanced to a position at which it is possible to begin a series of experiments and tests, essential to acquiring a fighting efficiency in their aerial fleet of a standard approaching that of their sea-surface and underwater squadrons and flotillas. That the overhead branch should, in a short time, be as formidable in the air as submarines are under water, and battleships, cruisers and torpedo craft are on the surface, is in fact the aim and object of the whole personnel of the naval aerial branch. Traditions have to be created, and they are to be of the most inspiring order if courage and devotion can bring them into being. Bomb-dropping, with prizes to en-

courage the competitors, is to be introduced forthwith, and become part of the everyday drill and exercises at the aerial stations around the coast, at targets marked out at convenient local spots on land belonging to the State. "Spotting" will also be one of the functions performed by aircraft for a fleet or particular ship carrying out battle practice, with the spotting airman at a height well out of reach of hostile gun fire, as he would be in war time, the prompting being done by wireless messages. Then the pilots, or passengers, in seaplanes will fire at passing, or tethered, airships to see how much damage can be done to their envelopes by the seaplane marksmen using service rifles. All these arrangements will bring the officers and men to a better understanding of what the "real thing" will be like when the clash of arms occurs in what Tennyson called the "central blue"; and it should tend to place our aerial fleet ahead of those belonging to our neighbors.—*United Service Gazette.*

AIRCRAFT VS. SUBMARINE.—It is undoubtedly true that, under certain conditions, it is possible from a good altitude to perceive objects at a certain depth below the surface, but this is mainly the case with calm, clear water, with a favorable light. In the choppy grey waters which abound round British coasts, a submarine would rarely be detected, more especially as the view from the pilot's and observer's seats is, in the majority of cases, most defective at the present time, and the fierce slip-stream from the propeller revolving in front, added to the high speed of travel, render the use of goggles imperative. But, in the opinion of a writer in the *London Daily Telegraph*, minor difficulties such as these may, and no doubt will, be overcome in time, and experience alone can show in how far the aeroplane will serve as a protection against submarines.—*Scientific American.*

GERMAN AIRSHIP "S.L. 2."—Undismayed by the series of accidents which has befallen the *Zeppelins*, the Germans have now completed the *S.L. 2*, the largest existing airship. It has a capacity of 24,000 meters; the frame-work is of wood, and the airship is peculiar in having two lateral cars for the engines, each containing two Maybach motors of 170 h. p., besides the central car. The speed attained on the trial trip was 57 miles an hour, and the airship has since done 60 miles an hour. The *S.L. 2* is equipped with wireless, and armed with three machine guns.—*Army and Navy Gazette.*

SEARCHLIGHTS FOR AERONAUTS.—Germany will no doubt possess a very extensive system of high power signal lights for aeronautic use, and already there are some large-sized searchlights mounted in various places. We mentioned the electric searchlight at the Weimar aviation grounds, of which each flash gives 27,000,000 candle-power. For the use of aviators at a great height there is provided a large light on the top of the Taunus Mountain, at an altitude of 3000 feet. At present incandescent lamps give some 500,000 candle-power, but it is intended to use arc light so as to increase this to 50,000,000 candle-power. The revolving light on the top of the wireless mast at the Neustadt station gives four-minute flashes of 300,000 candle-power, using an arc lamp for the purpose. We also note the Berncastel revolving flash, which has 150,000 candle-power. On the Doeberitz military aviation grounds is an acetylene light of 27,000 candle-power, which gives three-minute flashes, while at Kaditz, near Dresden, there is installed an eclipse lamp of 250,000 candle-power, in order to show landing places for aircraft. It gives two flashes in nine seconds. Illuminated numbers of large size are coming into use to show the aircraft head-quarters to pilots, and among these is the Johannisthal grounds, which has a number lighted by lamps to the amount of 30,000 candle-power. But larger ones of 85,000 candle-power are mounted at Bonn and at Winiary.

Other high power lights are installed at Königsberg, Metz, Strasburg, and Tegel, and signal lights on the Nauen and Belgerin on the wireless telegraph masts.—*Scientific American.*

ENGLAND'S AIR FORCES.—England's air force, which promises to become a very prominent factor indeed in the European conflict, has been very generally underrated on this side of the water. Undoubtedly Americans have been influenced to this view by the strong public criticism levied by the British opposition against the government during the last year on the ground that England's aeronautical defence had been neglected.

When we come to examine the facts in the case, however, we find that the English have been making tremendous strides, not only in the acquisition of aeroplanes, but of dirigibles as well. Not only has the government stimulated the production of British-designed craft, but has brought into the country for manufacture by British firms the cream of the work of the foreign inventors. Thus we find England with a very efficient existing force of aeroplanes, and a productive capacity the equal of any power on the Continent, not even excepting France.

Among the foreign aircraft now constructed wholly in Britain may be mentioned the German *D. F. W.* biplane and monoplane, the former holder of the world's height record, together with the Mercedes motor, the best aeroplane engine built anywhere; and the *Deperdussin, Henri* and *Maurice Farman, Bleriot, Caudron, Nieuport* and *Brequet* machines from France. Besides the German Mercedes motor already mentioned, the Austro-Daimler and Benz, also German engines, are made by English firms, together with the famous Gnome, the Rhone, Anzani, Renault, and other French power plants.

Britain Weak in Dirigibles.—In dirigibles Great Britain is admittedly weak. A long series of experiments, most of them resulting disastrously, has left her with only six, and three of these are small craft, built for test work only by the Royal Aircraft Factory, the *Gamma, Delta,* and *Eta.* The other three are all foreign-built, although the rights to the construction of the types have been acquired by British armament firms. Curiously enough, one of these dirigibles, the *Parseval,* came from Germany. This is the type known as non-rigid, torpedo-shaped, with four 150-horse-power engines and a maximum speed of just under 50 miles an hour in still air. The length is approximately 524 feet, the diameter of the envelope a little more than 50 feet, while the useful lift is nearly 9 tons. The *Parseval* has a radius of action of 26 hours, or about 1300 miles.

From France has been purchased a balloon of *Astra-Torres* type, smaller in size than the *Parseval,* the speed being virtually the same. In length the *Astra-Torres* is 246 feet, the diameter 45 feet, and the useful load 3½ tons. The radius of action is 12 hours in time and 600 miles in distance. Like the *Parseval,* the *Astra-Torres* is a non-rigid.

One of the most promising of European dirigibles is the *Forliani,* an Italian invention, and this is the type of the third airship in Britain's effective fleet. Two others of the same type are under construction in England, and will be rushed to completion. The *Forliani* is built on the semi-rigid system, with a length of 237 feet, a diameter of 26 feet, a speed of 44 miles an hour and a useful lift of 3 tons. Her radius of action is approximately 500 miles.

Strong in Aeroplanes and Pilots.—While the paper strength of the British Army's aeroplane force is 250 war machines, the total number of aviators receiving certificates at the various schools exceeds 800, three-quarters of whom have been military men, and as such immediately available for war service. With the productive resources available, Britain can speedily equip her military pilots, and in a short time raise her aeroplane strength to 500 or 600 machines.

It is probable that her dirigibles and army aeroplanes will be used defensively for the most part by Great Britain, and will stay on the island, as France and Belgium have sufficient aircraft at present to take care of all

the necessary scouting. In connection with the British naval operations, however, the aeroplane may play a most prominent, even a decisive part.

A brief glance at the naval situation will show the importance of Britain's aeroplanes. The German fleet, retiring through the strongly fortified Kiel Canal, is playing a waiting game. Britain, to cut off all supplies by water, must blockade the German coast, employing a fleet strong enough to defeat Germany's first-line naval force. Undoubtedly the German policy will tend toward weakening in every way the blockading fleet, sending out submarines, just as was the case recently, to do all the damage possible, and thus reduce the disparity in numbers and strength which now exists.

In the defence against these attacks the British seaplanes will prove of inestimable service. From the air submarines can be detected even when a hundred feet below the surface, and warning given the ship or ships about to be attacked. Furthermore, with the British machines scanning the exit to the Kiel Canal—and this can be safely done at a distance far beyond gunfire—no sudden excursion by the German fleet can be made without ample notice for the British.

RADIO

GERMAN WIRELESS EQUIPMENT.—The German wireless equipment for war is described by G. Basil Barham in the *London Daily Telegraph*. Only along established lines of communication will wires be laid for telegraphic and telephonic purposes; the field equipment consists almost in entirety of portable wireless telegraph outfits. The Kaiser's forces are now equipped with a means of communication so light and portable that a motorcyclist with a side car could readily transport one of the smaller outfits some 200 miles in a day.

The short range instruments will send and receive over an average distance of 35 miles. The larger sizes are considered capable of sending 180 miles or more. Portability and ease of erection have been considered of more importance, however, than the distance to which messages may be sent. Any of the equipments can be unloaded, set up and at work within 15 minutes of arrival, and can be taken down and packed in even less time. A horse will easily carry an outfit of average range, while a long distance set can be carried by four horses which also carry riders. The German equivalent of our engineers have devised a stretcher of bamboo on which one of the largest sets in use can be carried by eight men over the roughest of country. The usual wireless crew consists of seven men, two to look after the horses and five to set up and dismantle the set, with two officers to send and receive messages.

The mast, which is made of an alloy of aluminum, is built in eight sections of 6 feet in length, provided with slip joints. The bottom member is provided with a pointed shoe. This is sunk in the ground, but guy ropes are provided, so that for hurried work the sinking is not done, but those of the wireless crew who are not sending or generating electricity simply hold the mast in position.

The aerial consists of a number of bronze wire conductors radiating out like the ribs of an inverted umbrella. These are accurately balanced and counter-poised, and the radiating wires are attached to insulators fastened near the bottom of the mast. For sending purposes dry batteries are used, but in case these are not available a small dynamo, coupled to a pedaling arrangement, forms part of the outfit. With this a man can easily provide a current of one ampere at 50 volts, which is amply sufficient for sending purposes. The weight of dynamo and pedal drive is 99 pounds, so arranged that it can be carried by one man by means of straps across the shoulders. The wave length is about 364 meters, with a coupling of 8 per cent unvariable, and the equipment can exclude waves of 5 per cent variation. The

sending can be carried out with great rapidity, and the transmitting and receiving apparatus, without the mast and aerial, weigh only 85 pounds.

TELEPHONE BRIDGE ACROSS THE SEA.—Press dispatches state that while giving evidence before the Dominion's Royal Commission recently, Godfrey Isaacs, of the American Marconi Company, declared that Mr. Marconi expects to establish wireless telephone communication between Carnarvon, Wales, and New York, as soon as certain mechanical details have been carried out at the former station, and he hopes that this will be done before the end of the year. So far, Mr. Marconi has made public no tests or experiments that would justify such a prediction.

TUCKERTON RADIO STATION TAKEN OVER BY NAVY DEPARTMENT.—President Wilson has decided that one or more high-powered wireless telegraph stations on the Atlantic coast should be taken over by the government for its exclusive use while the war lasts in Europe, and an executive order to that effect was made public by the Navy Department on September 5. The radio station of the German company at Tuckerton, N. J., was formally taken over by the Navy Department on September 8. This station will now be operated by a complement of officers and enlisted men of the navy for the transmission of code messages from embassies here to European capitals. The Act of August 13, 1912, for the regulation of radio communication provides that a person, company or corporation within the jurisdiction of the United States shall not use any apparatus for radio communication as a means of commercial intercourse between the states or with foreign nations, except under and in accordance with a Federal license. These licenses are revocable for cause. The act provides also that the President in time of war or public peril or disaster "may cause the closing of any station for radio communication and the removal therefrom of all radio apparatus, or may authorize the use or control of any such station or apparatus by any department of the government upon just compensation to the owners." It is understood that the government in operating the station at Tuckerton will collect for the service provided and will compensate the owners of the station. Several weeks ago Secretary of State Bryan notified the officers of the Tuckerton plant that it was being operated without a license and that it could be seized by the government. The owners of the station thereupon closed it.—*Army and Navy Journal.*

RADIO IN GERMAN NAVY.—The last 12 months are said to have witnessed important improvements to the system of wireless telegraphy favored in the German Navy, notably in the direction of increased radius. Last November the cruiser *Nürnberg*, then stationed in the Pacific, received perfectly audible messages from the station at Yap, 6600 nautical miles distant. The chief naval land station at Nauen, in Germany, is in constant communication with Togo, West Africa, a distance of 2800 knots over land. At the beginning of last year Nauen also got into communication with a station at Sayville, U. S. A., 3500 knots distant. Since then it has been possible to send messages as far as Windhuk, South-West Africa, a distance of no less than 4500 knots. All these results have been attained with the Telefunken system, which has hitherto been used exclusively in the navy, but success has likewise attended experiments made with the Goldschmidt high-frequency apparatus, by means of which messages have been exchanged between Eilvese, in Hanover, and Tuckerton, U. S. A. In recording these achievements *Nauticus* remarks that future progress may be looked for in connection with high-frequency apparatus. The excellent wireless work done by German cruisers on the China station has been more than once referred to in this correspondence.—*Naval and Military Record.*

RADIO INTERFERENCE OR "JAMMING."—It would appear from an article by Commander F. G. Loring of the Royal Navy in the *Naval Annual*, that tactics of this kind are by no means successful. The author's remarks on this subject are as follows:

Interference caused by other stations, such as international interference of an enemy, is of far less importance than is generally supposed. It is an extremely difficult thing to seriously "jam" a well-organized communication, and there are many ways, both technical and methodical, of defeating such an intention.

A good deal of misapprehension exists in the minds of the public concerning this question of "jamming." It is to a large extent a question of degree, and in the present state of development of wireless telegraphy it is a far more important problem from a commercial point of view than from a strategical.

The success of a commercial line of communication depends on the amount of traffic that can be handled in a given time. Interference and atmospherics may exist to such an extent that the service cannot be carried on on a remunerative basis. From a strategical point of view the case is different. It is desired to get a comparatively small number of messages through to some distant point with absolute certainty—messages which in most cases cannot be delivered by any other known means. It is the opinion of the writer that given good apparatus and a highly-skilled personnel, it is absolutely impossible for an enemy to prevent a wireless message reaching its destination. It is not easy even to delay it for any considerable time.

Ineffectiveness of Intentional Interference.—As an instance of the ineffectiveness of intentional jamming, I find in a report of the wireless communications of the 1906 Naval Maneuvers the following interesting paragraph: "No serious interference was caused by intentional or unintentional jamming, though the enemy resorted to this for 40 hours without ceasing." In connection with this question of the possibility of effective jamming by an enemy, it must not be overlooked that by attempting it the enemy is certainly putting his own wireless communication completely out of action for the time being, while it is very doubtful if he is seriously inconveniencing the communications of his more distant opponent. Severe atmospheric disturbances are far more difficult to deal with than interference, and there are undoubtedly times and places when it is absolutely impossible for an operator to receive a message for several hours at a stretch.

Code Messages.—The danger involved through the interception of a fleet's signals by an enemy is also often overrated. Co-operation between operators and full knowledge of each other's methods is extremely important when handling difficult code messages, and the more skilled the organization, the more difficult it is for a strange operator to take down with the necessary accuracy the groups of a code message. He cannot ask for the repetition of doubtful groups, and he has no intimate and daily familiarity with the methods of his opponent to assist him in his task. And, after all, giving the enemy every advantage, giving him a perfect record of the signals, the key of the code to his hand and equal facility of skill and language to translate it for use—a most improbable combination, it must be admitted—he has still failed to prevent the all-important information reaching its destination.—*Scientific American.*

WIRELESS TELEGRAPHY IN AVIATION.—A vivid idea of the activity which has been displayed, particularly in Germany, in the adaptation of wireless telegraphy to aviation, including sending and receiving apparatus and devices intended to facilitate position finding, is contained in an article referred to in the *Digest.* The importance of these matters from a military standpoint is obvious, especially in the case of dirigibles, which have a fairly long radius of action. This radius in recent airships amounts to several hundred miles, and consequently wireless apparatus of considerable power has to be installed to insure efficient communication between the ship and her base. The problem of adequate antennas is, of course, easily solved on a dirigible, the length of which is sufficient to provide plenty of room, and, indeed, there is no difficulty in getting a reasonable amount of power in the apparatus because of the great carrying capacity of this type of airship.

For obvious reasons not very much information is given about the actual details of equipment as applied to military balloons. There is no doubt, however, that light generating sets are in existence which are quite capable of sending wireless dispatches over long distances if not interfered with. A daylight working range of 200 km. is claimed for some of the German sets weighing scarcely over 50 pounds. More than this can, of course, be reached with apparatus of a weight easily transportable in an airship, and several times this range might conceivably be at times necessary.

It must be admitted, however, that airship equipment of even this power would be very susceptible to "jamming" if operating far from their base. In a military sense, however, it is likely that most valuable scouting work will be done at inconsiderable distances over which wireless conditions would remain fairly good. As to position finding with long horizontal receiving antennas, it is possible, as the article before us indicates, to get considerable information from a properly organized system of sending stations. Inasmuch as flights at great height are not likely to be attempted by this class of flying craft, the present opportunities for successfully applying "wireless" to position finding seem to be somewhat limited. More interesting technically are the possibilities of wireless installations on aeroplanes. Material headway has been made, too, in this branch of the subject, but the somewhat limited size of the sending apparatus and the difficulty of carrying suitable antennas complicate the situation. Various methods of installing antennas have been tried, the favorite one appearing to be a trailing bronze wire carried clear of possible interference with the propellers. A range of sending and receiving distances in the neighborhood of from 50 km. to 100 km. has been experimentally reached with equipment of practicable weight. As to the particular character of sending and receiving apparatus used, it is apparent that all the familiar equipment has been tried, the differences from ordinary practice being merely such as are consequent on the necessary reduction of weight and bulk. It would be exceedingly interesting to know how far, if at all, wireless communication has been tried on the present scene of hostilities; but the beautifully effective suppression of all ordinary sources of information leaves us quite in the dark as to the actual practice of aerial scouting in this respect. The time gained in sending home reports of observations by wireless telegraphy would evidently be worth something, let alone the possibility of receiving in this way messages from airships which might be unable to get home.—*Electrical World.*

WIRELESS TELEPHONY.—An article in the Paris *Matin* which has excited much interest refers to some interesting experiments in wireless telephony carried out by Captain Colin, of the French Navy, who has been at work on the subject for some years in collaboration with Lieutenant Jeance. The details of the apparatus are not given, but it would appear that some improvement has been made in the direction of maintaining steady and continuous oscillations at the transmitting end. Speech, it is stated, has been transmitted from Paris to Finisterre, a distance of 300 miles, and a type of field apparatus with a mast about 90 feet high has, it is said, been developed, which can be unloaded from a motor-car and set to work by a crew of six men in 21 minutes, and will transmit without difficulty over a distance of from 60 to 120 miles.—*Scientific American.*

CHINESE WIRELESS STATIONS.—The new wireless telegraph station constructed by Siemens for the Chinese Government at Woosung, where the Huangpu River, on which Shanghai stands, enters the Yangtsze, is now complete.

This station is one of a chain of Telefunken stations to be established at Kalgan, Peking, Hankow, Shanghai, Swatow, and Canton, for which an agreement was concluded in March, 1913. All these are now completed, except those at Swatow and Hankow. For several days Woosung has been

conversing with Tsingtao, and longer trials were to have been made, but were prevented by exceptional heat and atmospheric disturbance.

It is an interesting question how this system may affect the position of the projected Marconi agreement.

On July 16 the Marconi Company announced that the Chinese Government had issued an official letter authorizing it to issue two million sterling five per cent Chinese bonds in payment for the erection of a number of wireless stations in China, and that the formal contract had been sent on from Peking for signature.—*London Times.*

CANALS

THE PANAMA CANAL OPENING.—With the successful passing of the Panama Railroad steamship *Ancon* through the canal on August 15, in 9½ hours, the big man-made waterway, one of the wonders of the age, was officially opened to the commerce of the world, and is now ready for the use of all vessels drawing not to exceed 30 feet.—*Army and Navy Journal.*

THE PANAMA CANAL'S NAVAL SIGNIFICANCE.—So much have the commercial values and aspects of the Panama Canal absorbed the interest of Americans that it may seem to many of them its opening for business in the midst of a worldshaking war partakes of the nature of an anachronism, even if the United States is not one of the belligerents. In reality there is a certain fitness in the realization of the dream of Balboa and the prediction of Goethe coming at this particular time. The canal is a great "short cut" open to the use of the world, but it is also a part of the scheme of the military defence of the United States. It doubles the mobility of both our land and sea forces, and was built with this consideration in mind. No event in our history gave more impetus to the construction of the canal by the United States than the voyage of the *Oregon* around Cape Horn to join our fleet in the Caribbean. The necessity of sending a battleship over so many thousand miles of ocean impressed the nation with the importance of having at our command a short route between the Pacific and the Atlantic. The arguments of war and peace are both represented in the canal, built, owned and managed by the United States in its sovereign capacity.—*Boston Transcript.*

THE BALTIC AND BLACK SEA CANAL SCHEME.—The project for joining up the natural waterways between the Baltic and the Black Sea by the construction of artificial connecting channels has recently made an important advance. Although primarily intended for the development of commerce, the strategic value of such a connection between the great seas to the north and south of Russia will not be lost sight of, in view particularly of the demonstration of the value of the Kiel Canal in the German scheme of naval tactics. Thus, an impetus will be given to the Russian project, which cannot be without great influence on the present study of the report of the Government Commission appointed to investigate the whole subject. This commission, which was appointed by the Duma and Senate four years ago, while intended to make a comprehensive survey of the whole scheme of internal navigation in Russia, was required to give primary consideration to the Baltic and Black Sea Canal scheme, and particularly the proposal to construct locks to circumvent the rapids on the great southern river, the Dnieper, which rapids at present check the complete utilization of this great natural waterway, piercing northwards from the Black Sea into the very heart of European Russia. With its tributaries it affords navigable channels of nearly 4000 miles, excepting for the obstructing rapids near the mouth. The canalization, for moderate-sized ships, of a connection between the river north and south of these rapids, now decided upon, must itself have a very important influence on the internal trade of Russia, apart alto-

gether from the advance which would thereby be made towards the realization of the main project of water communication between the Baltic and the Black Sea.

A study of the map of Russia shows that the rivers of European Russia flow over great, broad plains between the two ranges of the Carpathian Mountains in the west and the Ural Mountains in the east, and that between the Baltic and the Black Sea two of the principal rivers are the Dnieper and the Dwina, the former, as we have said, flowing into the Black Sea at Kherson, and the latter into the Gulf of Livonia at Riga, and thence into the Baltic Sea. These rivers, too, are navigable for small craft for great distances into the interior, although in the case of the Dnieper there are rapids, owing to the great step-like formation, between the towns of Ekaterinoslav and Aleksandrovsk, some 200 miles from the mouth of the river, and in the case of the Dwina in the last 100 miles or so from the mouth to Jacobstad. As will presently be explained, there are projects for instituting electric-power generating-stations at the falls in both instances; but the necessity for navigation will be the primary consideration, the harnessing of waterfalls being subsidiary and contingent upon the requirements of shipping.

The sources of the two rivers at the "divide" are not far apart, and the idea of connecting them by artificial waterways occurred to Peter the Great, who called in a Dutch expert to make a survey of possible routes through which canals could be constructed. Catherine II supported this work of survey, but it was not until Russia had absorbed the Polish provinces that any material progress was made with the project. The canals then made, early in the last century, were intended for flooding purposes, and not really for shipping. Within the last 20 years schemes for a deep canal without locks have been worked out, but the authorities considered the scheme impracticable from the financial point of view. Ultimately, as the result of private initiative, a company was formed and laid a scheme before the government for the construction of a waterway free from locks, and with a depth throughout the navigable channel of 14 feet. The main aim was to develop interior trade, and at the same time to afford a means of transit for merchandise passing through the Suez Canal to the countries on the shores of the Baltic and the Baltic Sea ports. It was proposed in this project to use large boats with motors, which would receive the goods at the terminals of the canal and deliver them either on the waterway or to large ocean-going vessels at the other end. At the same time the strategic value of the canal was recognized, but the scheme did not then meet with sufficient support. Now, however, owing to the more liberal constitution which has been introduced into Russia, and when more attention is being devoted to trade and commerce, there is greater prospect of the government recognizing the value of such an opening up of the natural resources and industrial potentialities of the interior of European Russia. Last year a large number of members of the Duma took the initiative for the actual completion of the Baltic-Black Sea Canal; they urged that exhaustive plans of the entire waterway, at the instance of the Public Works Department, should be ready at the beginning of 1914, and that from next year the budget of this department should contain annual grants sufficient for the completion of this waterway in the course of five years.

The scheme which commends itself is that to which we have already referred—namely, the joining of the upper waters of the Dnieper and the Dwina, thus connecting Kherson, on the Black Sea, with Riga, on the Baltic. The length of such a waterway would be about 1540 miles. The Dwina extends southward from the Riga port on the Baltic for a distance of 625 miles. Formerly there was a very extensive use of this waterway for barges, of which 21,000 annually traded to Riga with corn and other products from the upper reaches of the river. These barges had a carrying capacity of about 225 tons, and were carried down with the stream when the melting snow created a spate, but they were of little use for carrying supplies up country. Railway competition soon killed this method of trans-

port, and now sailing vessels of from 10 tons to 80 tons or 90 tons capacity are used, and are navigated in both directions. Under these circumstances the traffic has not increased greatly (except for the floating down of timber, to be made into rafts for shipment at Riga). In the upper reaches, however, for a distance of some 380 miles or so, steamers are in use, while for 940 miles, in tributaries and in navigable channels connected with the River Dwina, small steamers can be navigated. The river, from Vitebsk to Riga, a distance of about 370 miles, has a total fall of 348 feet, but the greater portion of this, as already indicated, is in the lower part of the river. The proposals for three hydro-electric power-stations—one of 4000 horse-power and two of larger power—have been made in association with the canal parallel to the rapids; but, as has already been indicated, these will be subject to the main idea of making a canal through to the Black Sea. It may be said that from the upper Dwina a waterway debouches and communicates with St. Petersburg, but no survey has been made, although it is understood to offer no special difficulty in the way of development for navigation.

It is proposed to make a connection between the upper navigable part of the Dwina and the upper navigable part of the Dnieper, not by using the abandoned canals made 110 years ago, but by following the course of a tributary of the Dwina and one of the Dnieper near the watershed, which is some miles to the west of Smolensk. In the uplands there are two lakes which would be most useful for the feeding of the canals on each side of the water divide. The level of the water of the Dwina at Vitebsk is about 70 feet lower than that of the Dnieper at the most suitable point of junction. The distance between the rivers to be canalized is under 60 miles, and the proposal under consideration provides for three locks for the Dnieper and eight for the Dwina from the highest point. The cost of this canal, with wooden locks, is estimated at about 19,000,000 roubles, and with stonework locks 6,500,000 roubles more.

The Dnieper, which is the third largest river in Europe, the Volga and Danube excelling it, has a length of nearly 1350 miles, and in its course there is a population of something like 20,000,000. With the tributaries the total waterway is nearly 8000 miles, of which about one-half is navigable for small vessels. The products of the district are corn, timber, ore and coal, and undoubtedly there would be a great development of the natural and mineral wealth were the route to the sea improved. The obstacle, as we have mentioned, is the rapids between Ekaterinoslav and Aleksandrovsk. The largest vessels using the river below the rapids have a capacity of about 1000 tons, and more than 300 steamers and 1200 sailing craft are engaged in the service. Above the rapids the river, so far as it is to be used on the route, from sea to sea, is navigable for a distance of over 800 miles, and beyond this it is proposed to use the Beresina and the new canals already referred to. The Beresina is about 260 miles long and has a fall of about 90 feet, and it is proposed to canalize this portion with 14 locks. Beyond this, as already indicated, there will be the canals connecting with the Dwina River, flowing into the Baltic. Although in the upper navigable part of the Dnieper there is a fall of 200 feet in 560 miles, it is thought that it would be practicable to make it navigable for larger vessels without locks, by means of regulation works and dredging. For 160 miles of the distance in the upper navigable region of the Dnieper, sandbanks are experienced, and regularization and dredging will have to be extensively done; for the next 270 miles the principal work would be the consolidation of the banks, and for the remaining 130 miles or so to the rapids there is granite. Then come the rapids, the river breaking through a granite ridge. The fall in a length of 40 miles is 90 feet. Timber is floated through here, but the river is impossible to navigation, except at spates. Recently projects have been proposed for the harnessing of the water power, and a commission was appointed to investigate the subject. The plan now proposed is to build at the foot of the rapids a dam of granite, with Portland cement mortar. The canal for the passage of ships

—parallel to the river, but independent of the flow to the turbines—is to be 90 feet wide at the bottom, with a minimum radius of 1500 feet; the depth of water is to be about 7 feet, and the canal is to be constructed of brickwork where it does not pass through the natural rock. The locks are to be made in pairs alongside each other, and to accommodate two vessels 180 feet long, with a tug-boat 120 feet long. The cost of the work in connection with the navigation is calculated to be between 27,000,000 and 28,000,000 roubles. The water-power part of the undertaking is designed for three power-stations with vertical reaction turbines; the aggregate capacity throughout the whole year is calculated to be 100,000 horse-power. The current, of 5000 volts, will be transmitted to the distributing stations in the vicinity of Ekaterinoslav and as far as Nishni Novgorod. A French syndicate is understood to have just made an offer to the Russian Government to undertake the construction of the locks and hydro-electric power-stations on the Dnieper.

The funds for the improvement of the Dnieper River from the mouth at Kherson to the falls were voted some four years ago, and the work is probably completed by this time. The actual commencement of the work, through the medium of the State, of an undertaking comparable with that of the Siberian railway, will, if decided upon by the Duma, be of great advantage to the commerce and industries of Russia. Mr. A. Pabst, harbor engineer in Riga, who has for years been deeply interested in the movement, and on whose recent lecture on the subject our article is based, is to be congratulated on the progress of the propaganda work.—*Engineering.*

MISCELLANEOUS

THE BRITISH NAVY'S PEACEFUL VICTORIES.—All the trite phrases as to the importance of sea power to an island kingdom, which is the nerve center of a maritime empire, have been brought to mind by the victories which the British fleet has won almost without firing a gun or discharging a torpedo. During the days of peace, which were filled with fearful anticipations of the penalty of war, it was foretold that as soon as hostilities commenced British shipping would be ruined and our supplies of food and raw material would be cut off. The most careful inquiry tended to confirm this anticipation; it was felt that we dare not—so great were the risks—be optimistic. In the months immediately preceding the outbreak of hostilities, a sub-committee of the Committee of Imperial Defence considered in every detail the problem of how the people of the United Kingdom were to be fed during war time. With the most expert evidence at their command, they came to the conclusion that the peril was a real one, and that the government ought to take precautionary measures in order to minimize it. One of the first acts of Mr. Asquith's administration, when war was inevitable, was to announce that the government itself would take 80 per cent of risk which shipping would run under the war conditions which were then developing. A war risk office was immediately opened and a rate of 5 per cent was quoted. Day by day followed, and though it was known that several German cruisers were still at large, no news was received of any loss. Gradually the confidence of shipowners and shippers was re-established. Private firms showed no hesitation in undertaking war risks at a lower rate than the government office. Within a few days the premium fell from five to four guineas, and eventually it was brought down to three guineas. Even at this figure underwriters were prepared to undercut the government office. British shipping, which was at first disorganized by the dramatic circumstances under which war occurred, has since been resuming its normal course. As a nation we may congratulate ourselves on the astounding victory which a supreme fleet won in insuring to us ample supplies of food and raw material without

striking a blow. Never was so remarkable a demonstration given of the vital importance of sea power to a people who live by and on the sea. The navy opened up a pathway for British trade, and at the same time and by the same process strangled the oversea trade of Germany. This was the first victory of the British fleet; the second was hardly less notable. The navy was mobilized on the morning of the day on which the ultimatum to Germany expired. From the very first the naval authorities—so great was their confidence—were enabled to give to the War Office an assurance that when the expeditionary force was ready, safe transport could be afforded to it. As quickly as troops could be organized into suitable units they were carried by train to the coast, there embarked in ships which the Admiralty had chartered, and carried, without let or hindrance, to the Continent. Within less than a fortnight of the outbreak of war the whole of the expeditionary force detailed for foreign service had been transported across the sea and had taken its stand beside the armies of France and Belgium. Nor is this all. From the far distant Indian Empire the government were able to arrange, without incurring any perilous risk, for the movement of two divisions of troops over sea. Without a doubt as to the safety of the ocean communications of the Empire, they were in a position to accept offers of armed forces from New Zealand, Australia, and Canada. In a word, the British peoples, in the very opening days of the war, were reminded that the often repeated statement that the army is carried on the back of the navy is no mere phrase, but a reality upon which our safety as an imperial people and our value as a friend to our neighbors depend. Once more we have had illustrated before our eyes the potency of sea power as the first line of defence of a people who live "on land completely surrounded by water," and are responsible for the protection of 400,000,000 subjects in other sections of the Empire, to whom the open seaways are essential to life.—*Naval and Military Record.*

BRITISH AND GERMAN NAVAL PERSONNEL COMPARED.—The *Naval and Military Record* (British Service paper) comments on the *personal equation* as follows:

Shall we reap the benefit from our long service navy which we always hoped would be ours if war came? As Mr. Archibald Hurd has pointed out, when peace reigns the tendency is to compute naval strength in ships of war, but war reinforces the conclusion that a far surer guide is the number and character of the officers and men. We may be grateful that the naval authorities were adamant during the past few years in their demands for a larger personnel and that Lord Fisher had the genius to establish the Royal Fleet Reserve—numbering 30,000 men—on which we could draw in an emergency. In the opening year of this century—only fourteen years since—we had practically no trained reserve. Reforms were introduced and the foundation of our strength and confidence in facing the enemy lies in the ease with which, by a parliamentary formality, the Admiralty have been able to secure without delay or confusion a well-seasoned and trained body of over 200,000 officers and men. The triumph has been achieved without calling up more than about 20,000 merchant seamen, and thus the merchant navy, so essential if we are to receive the food and raw material, has not been laid up. Nor is this all. The average service of the men manning the German ships is only, probably, two years—there are some thousand long-service volunteers, but of the remaining conscripts some have served nearly three years, others almost two years, and others, again, about 20,000, only nine months. On the other hand, 90 per cent of the British crews have been at sea five years or more. Most of the German sailors come from inland districts moreover; ours are real seamen. If, therefore, there is anything in the sea instinct and in acquaintance with sea conditions, the men who are now on board British ships of war awaiting the supreme contest ought to triumph. No one can prophesy what the future may reveal, but the nation has ground for sober confidence.

THE LAW OF THE SEA.—*Liability of Shipping to Capture—The Rights of Passengers.*—The fact that the German authorities have stopped the sailing of the *Imperator* and *Vaterland,* which in the ordinary course would have called at Southampton on their way to America, calls attention to the position in which the merchant shipping of belligerents would be placed, whether engaged in cargo or passenger trade. It is still generally recognized as a sound principle of international law that an enemy's vessel is liable to capture, either in territorial waters or on the high seas. It has been pointed out by a learned writer on the subject that in face of the results maritime capture has often produced it is idle to pretend that it is not among the most formidable of belligerent weapons; one cogent reason being that by rendering sailors prisoners of war it saps the offensive maritime strength of the belligerent to which the vessel belongs. It has been said that this principle has been weakened in modern times. In 1865 Italy adopted a marine code by which the capture of mercantile vessels of a hostile nation by Italian vessels of war was forbidden in all cases where reciprocity was observed, and a similar course was followed by Austria and Prussia in 1866. In 1870 Prussia exempted French vessels from capture without insisting on reciprocity. But special reasons may be assigned for the departure from old methods in those instances, an important consideration being the comparative maritime weakness of the powers concerned at that time. When we come to more recent times we find that Count Caprivi, Chancellor of the German Empire, in 1892 pointed out that the changes which had come about in the methods of conducting a maritime war did not tend to favor the protection of private property at sea. He said in substance that not naval battles but either invasion or the destruction of the enemy's commerce would in future bring a war to an end. Invasion was often impracticable, and thus the destruction of trade was the one and only method to attain the object of the belligerent power.

Assuming a state of war to exist between England and Germany, there can be little doubt that it would be considered necessary to strike at the merchant shipping of the enemy; but apart from the risk of actual capture the problems of insurance call for consideration. Marine insurance is nowadays of an international character; and it is significant that English underwriters deposited some time ago at the Chamber of Commerce in Hamburg an undertaking in writing to fulfill their obligations to German creditors at the due date, war or no war. Such an undertaking could not be enforced at law in the courts of either country either during or at the conclusion of war, at any rate in respect of losses occurring while war was in progress. The courts do not recognize an alien enemy as having any *locus standi* whatever. Thus if, for example, war were to break out between England and Germany while a German vessel was on a voyage to America, and the vessel was lost through a peril of the sea, the owners would have no remedy against English underwriters who had insured her.

While, however, the enemy's vessels are liable to capture, and goods on board to confiscation, it is generally recognized that destruction is to be avoided wherever possible. Passengers on an enemy's ship would be liable to be disembarked at the earliest opportunity, and they would have no remedy in contract or tort; but they would run little risk of more serious consequences, since it is almost unthinkable that a passenger vessel would resist capture by a man-of-war. Still, it must not be forgotten that a vessel seeking to evade capture would be liable to be fired upon and possibly sunk.—*London Times.*

PRIZE COURTS.—In various parts of the empire Prize Courts are now being constituted to deal in judicial fashion with the captures which have been made of the enemy's shipping. The last Prize Court was held in 1854, during the Crimean War. The case of the *Leucade,* which was decided in that year, was the subject of a long and important judgment by Dr. Lushington. In the course of it he said that the great desideratum of a Court of Prizes was "to preserve undiminished the rights of neutral states, without

derogating from rights equally sanctioned by the law of nations—the rights of belligerent powers, and so reconcile the abstract principles of justice with practicability." By the Judicature Act, 1891, the Probate, Divorce, and Admiralty Division forms the Prize Court for Great Britain and Ireland. In other words, that section of the division—the Admiralty Court, of which Sir Samuel Evans is president, the Admiralty Registrar, the Marshal, and the clerical staff—forms the Prize Court, and the Prize Registry, which is in the Royal Courts of Justice. Every ship taken into port as a prize, or seized in a port by a collector of customs, has to be delivered over to the Marshal, as the officer of the Prize Court, for safe custody. *The Times* points out that the procedure of the court is regulated by a series of rules intended to modernize the practice of the court. These rules are also applicable to proceedings in the Colonial Courts of Admiralty, which are the Prize Courts in the overseas dominions.—*Naval and Military Record.*

THE BOY SCOUTS.—All Europe has been aroused to the value of the boy scouts for helping the countries at war. They have begun not only by arresting spies in Belgium, but by guarding bridges in England and taking hold to harvest crops in several countries. The scouts are not expected to take part in battles or to follow up and look out for the wounded. That is for older heads and bodies, but there is a vast amount of public service the boys can render, and their organization appears to have fitted them for the work to such a degree of proficiency that they are already famous. In all the embroiled Europe there are reported to be about 35,000 boy scouts. Great Britain has 200,000, Germany 50,000, France 8000, Austria-Hungary 15,000, Russian Poland 8000, Servia 4000, Scandinavia 30,000, and other places 35,000. It was in England that the boy scout movement was started, by Sir Baden-Powell, a few years ago, and it has been recently said that if Europe had started the scouting among the boys fifty years ago it would not now be at war, that not even the Balkan wars would have been fought, because of the ways of peace the scout teachings instill into the youth of different nations. These boys are taught that war is what General Sherman said it was, and that to fight in groups or single-handed is beneath the manly dignity of any boy. They are not taught to be cowards, but to so conduct themselves that others who offer to fight will be ashamed by the front the boys in scout uniforms put up to them. That makes the right material for soldiers of the best class, and the other training of the minds and bodies of the boys in the scout movement fits them for campaign work which is the essential feature of good soldiering in the sense of defending their kind against foreign foes. The scout boys are not less human than others, but they have been taught good manners, and that holds them in check against excitement and wild plunging into difficulties which can be adjusted only by fighting, but when that is the last resort the mannerly boys are there with the goods so strongly that the rowdies are taught by force to respect them. It is claimed in Europe that the older scouts will make fine aides to officers of armies, messengers and general utility factors, because of the training to hold their tempers and attend to such business as they are at without regard to the surroundings or play or dissipation in the wild ways of life. And finally when the armies are recruited from the boy scouts there will be different war conditions, if any. The material business of the country will be counted first, and the anger of race and religion and political intrigue last.—*Worcester Telegram.*

RATE OF GROWTH OF CORALS.—The rate of growth of corals is a subject which has been studied in greatest detail by Dr. T. Wayland Vaughn of Washington, D. C., at Tortugas and in the Bahamas, but upon which many other students have worked in a less exhaustive manner. For example, in

1890, Saville Kent measured and photographed certain corals off Vivien Point, Thursday Island, Australasia, and some of these we succeeded in identifying and remeasuring in November, 1913, and it appeared that a brain-coral, *Symphyllia,* which was 30 inches in diameter in 1890, had increased to 74 inches in 1913. Also a huge coral, which Saville Kent called *Porites-astræoides,* was 19 feet in diameter in 1890, and 22 feet 9.5 inches in 1913. On the other hand a certain grey-green *Goniastrea,* which was 8 feet two inches wide in 1890, had not grown during the intervening 23 years. Indeed, Dr. Vaughn's growth experiments upon Florida corals show that perhaps all corals grow to well-defined sizes and then cease to enlarge. However, the corals that did grow at Vivien Point had increased in diameter from 44 to 45.5 inches in 23 years, or about 1.9 inches per annum. Thus charts of channels which are only occasionally used, and the bottoms of which are covered with corals, should state that an upward growth of at least 1 inch per annum may be expected.

THE RED CROSS SOCIETY.—*Its Work and Methods in Time of War.*—One of the many lessons which the South African War taught this country was that its arrangements for medical and hospital work at the bases and in the field were seriously defective in organization. There were too many societies taking part in the work, with too little co-operation and understanding between them. The result was an unsatisfactory service and a great deal of waste. But the lesson was not unheeded. It was realized that the various leagues which were prepared to help the army in its care of the sick and wounded must be amalgamated and directed from a central control.

This was done. The British Red Cross Society, an organization embodying under one name and administration a number of hitherto separate societies, was formed in 1905. It can call upon 60,000 persons, many of them highly trained, to undertake field ambulance and hospital work. The services of this great army of helpers throughout their training, which includes many an arduous day's work at sham fights and displays, are given without any hope of reward and often without any acknowledgment. If they were called upon for serious work to-morrow at least 95 per cent would obey the call. In the present circumstances there is reason to think that the society will not call upon its members for foreign service; it will probably prefer to hold them in reserve in case they may be required by their own country, though it may be said that at present no decision has actually been made as to what course will be adopted.

The British Red Cross Society does not exist, as has sometimes been thought, to undertake itself the whole work of ministering to the sick and wounded. It is purely a contributory body. In time of war it would act under the directions of the Admiralty and the War Office, and its activities are limited by the nature of the war and of the climatic conditions under which it is being fought. The 60,000 members are registered at a number of branches spread throughout the country, each of which can decide for itself in what manner it will assist when assistance is asked for. The following decision of the Society may be quoted: "The contributions of each branch will be kept distinct, will be vested in funds approved by the Trustees Act, will be employed only in wars in which British forces are engaged, and will, in such event, be devoted, as far as possible, to the particular purpose determined by the branch."

The forms of aid which the Society is prepared to supply are many. They include the provision and equipment of hospital ships and trains, hospitals and convalescent homes, hospital requisites, clothing, toilet requisites, medical comforts, and food. To these may be added chocolate, playing cards, games, stationery, pipes, and tobacco.

Official Recognition.—The British Red Cross Society is recognized by the War Office and the Admiralty as the organization responsible for the Red Cross movement throughout the British Empire, and the terms of the arrangement between the heads of the services and the Society are included in "Field Service Regulations" (p. 108).

When the time came for the Society to undertake operations it would receive official intimation in the form of to what extent the War Office or Admiralty invites its assistance for the Army Medical Corps. Commandants and adjutants would receive notice of such requirements, and each branch would be called upon by them to state what it was able and prepared to do.

In the event of service being undertaken abroad, the first step would be the dispatch of a special representative to the scene of hostilities to draw up a scheme specifying the requirements of the situation. This would be communicated to the head office of the Society for consideration and endorsement. A great deal of waste and confusion may be thus avoided.

When war breaks out, and even before it has been declared, numbers of people make offers of help. They offer both money and personal assistance. The present crisis has brought forward a great many of such people already; but frequently the mistake is made of submitting such offers in the wrong quarter. Disappointment and irritation can be avoided if people with offers to make can be persuaded to hold them back until the right moment arrives and then to communicate with the Society.—*London Times.*

THE GERMAN INSPIRATION.—The following extracts are taken from the address of F. A. Scott, Secretary and Treasurer of the Warner & Swasey Co., delivered before the Cleveland Advertising Club:

I want to give you a suggestion of the size of Germany as related to a number of powerful European nations, and the United States, and the conditions under which that population lives. Russia, which has the largest area of any of the European nations, has 8,555,000 square miles. Germany comes next; but note the difference—208,000 square miles. Germany has an area about equal to Indiana, Illinois, Wisconsin and Michigan. France has 207,000 square miles, and England 121,000—that is, the British Isles. Russia has a population per square mile of about 19; the United States (and you will note that our population seems scant) has 32; France has 191, but Germany has 311. Just as soon as we know that, if we know anything about the Germans, we know we have a condition of compression which is going to grow so great that it must find relief.

And that is where the difference in policy came between Bismarck and the present Emperor. Bismarck had unified Germany. His mind rested largely on the idea of a centralized and a unified Germany; whereas the present Kaiser has seen the need for expanding the boundaries of his country, for finding places where the force and energy that have been developed by the German schoolmasters can find expression under other suns than in Germany.

Such a population as 311 per square mile presents a great problem in the feeding of the people. In most European countries where the population is so dense, the importation of food products is a necessity. England is a very marked example of that. England imports grain from a number of countries. She imports meat largely from this country and from Australia; her dairy products from Denmark, Finland, Norway and Sweden. Germany has developed her power to feed her people within herself, and has applied the wonderful science of that country to the problem of taking care of the population within her own boundaries.

Intensive Cultivation of the Soil.—I want to give you the inspiration of the agricultural figures of Germany, that show by what means she has accomplished this. In 1881 Germany raised of wheat 1397 pounds per hectare, about 2.47 acres; in 1913, 2596 pounds, an increase over the same

acreage of 85.8 per cent. Rye in 1881, 1199 pounds; in 1913, 2100 pounds—increase, 75.2 per cent. Oats in 1881, 1331 pounds; in 1913, 2409 pounds—increase, 81 per cent. Potatoes in 1881, 11,869 pounds; in 1913, 17,446 pounds—increase, 47 per cent.

Perhaps we would be interested to see how these figures compare with those for the United States. During the same 30-year period our yield of wheat per acre changed from 13.1 bushels to 13.9 bushels; of rye, from 13.9 bushels to 16 bushels; of potatoes, from 91 bushels to 93.8 bushels. The corn acreage of our country has increased tremendously in the 30 years, but my recollection is that we produce just as many bushels per acre to-day as we did 30 years ago.

You gentlemen are perhaps thinking that our conditions are different; that there is no reason in the United States, or at least there has has been none, for the adoption of the intensive methods of cultivation which Germany has adopted. And that is so. I want to say, after quoting the American figures, it probably has been better for us with our tremendous acreage and with the great amount of virgin soil that was available to the American farmer, to handle a vast acreage, but without such intense cultivation. In fact, with our scanty population, such intense cultivation is impossible. But the German figures are interesting to us as showing what can be done by a diligent nation on a naturally poor soil in rigorous climate.

Germany has met these agricultural problems by applying to them scientific methods in her drainage, in irrigation, and particularly in the use of commercial fertilizers. The consumption of commercial fertilizers in Germany increased from 1,600,000 metric tons in 1890 to 6,000,000 tons in the year 1910. There is an interesting thing about these commercial fertilizers. The German pig iron production has increased tremendously in these 20 years. By what is called the Thomas-Gilchrist process they were able to use high-phosphorus pig iron in steel manufacture, and the resulting slag was very rich in phosphorus. Grinding that up gave a product that they called Thomas phosphate flour; and to-day millions of tons of phosphate flour is used on the lands of Germany. So she not only increased her ability to produce steel but increased her ability to produce potatoes by using the invention of Thomas and Gilchrist.

See how this has reacted in other industries. In 1882 Germany used 344,000 threshing machines; in 1907, 1,435,000. There has been some work in the meantime to produce that difference. In 1882 there were 19,000 mowing machines in use and in 1907 301,000.

Remarkable Industrial Expansion.—The population of Germany about the time of the formation of the empire was 44,000,000 approximately. To-day it is 60,000,000. This immense growth in population, and particularly the crowding of the people into the cities—for in that respect Germany has had the experience of all civilized nations—the crowding of people into cities has necessitated the development of industries to employ those thronging workmen. So Germany is changing as other nations are from an agricultural to an industrial nation, but she has responded remarkably to this need.

Because my subject deals particularly with foreign trade, I am going to confine the figures of growth to a few dealing with the exportation of industrial products. The highest on Germany's list, the product in which she has advanced most, from 1883 to 1912, is machinery of all kinds. The value in 1887 of machinery exported was 52,800,000 marks; in 1912 it had risen to 630,300,000 marks. Coarse and fine iron products rose from 96,000,000 marks in 1887 to 581,000,000 marks in 1912. Coal exports from that small country rose from 79,900,000 marks in 1887 to 436,600,000 marks in 1912. Coke exports in 1887 were 9,000,000 marks; in 1912 they were 126,000,000 marks. Cotton, woolen and silk goods increased from 261,000,000 marks in 1887 to 966,000,000 marks in 1912. These figures explain

to all of us who have been in countries where we seek foreign markets why we find the German there, and we do find the German there, and he is there very strongly entrenched and he deserves it.

The German Merchant Everywhere.—I remember years ago, I think it was 1907, when my interest in the German was first excited. It was because in Mexico I noticed in every one of the 24 cities and towns visited on the trip, if you inquired for the hardware merchant or the leading man who could speak English, you were pretty sure to find he was a German.

In 1887 Great Britain stood first in pig iron production, the United States second, and Germany third. To-day the United States is first, with 31,000,000 tons in 1913, Germany second, with 17,000,000 tons, and England third, with 10,000,000 tons. The total pig iron production of 1913 of the world was estimated at 75,000,000 tons, and of this Germany, with her poor ore, produced one-fourth. To-day Germany ranks second in steel production, third in coal production, third on 208,000 square miles in the production of wheat and rye, and second only to the United States in the length of her railroads.

Within the period of 25 years, the percentages of increase in foreign trade of the three leading foreign export nations were as follows: United States increased 208 per cent, Germany 185 per cent, United Kingdom 119 per cent.

Military Training.—I think every student of the industrial problem in Germany will agree in the great advantage which Germany has in her military training. The influence of two things it seems to me is particularly marked in Germany—the German schoolmaster and the German drillmaster. Of course, to begin with, Germany is a Christian nation. I think that helps, and I am founding everything else on that. You know that until within a few years most of the men who grew to maturity in Germany served in the army. Now their population is increasing so rapidly that they do not have to be as severe in the selection of men. Of the total number offering they select fewer to-day than they did some years ago; but nevertheless the great bulk of the male population of Germany for a hundred years has been trained in the German Army. I believe you can see in every man in that country the effect of training in habits of discipline, self-respect and honesty. In that particular Germany has a lead over both England and the United States, and this probably we will be many years in overcoming, if we ever adopt such a system.

Germany's Power on Water.—I am not speaking to-day as a jingo, but speaking only as an American business man may. I want to quote to you a paragraph from a pamphlet written by Dr. Karl Helfferich, Director of the Deutsche Bank, which he wrote in celebration of the present Kaiser's 25th anniversary. This deals particularly with the relation of the German naval power to foreign business:

"German economic life is conscious of being strong enough, in times of peaceful competition, to maintain and strengthen its position. But the temptation for a strong nation to make use of its political and military resources against a weaker one in the struggle of economic competition has at all times been very great. The numerous wars over commerce in the history of the world give evidence of this. All the progress of culture and civilization in the life of the nations must not deceive us and cause us to forget that any too-sharp divergence in the development of economic strength and political power creates a tendency toward a violent explosion and re-establishment of equilibrium. Knowing this, Germany, which is compelled by its geographical position and its experience in history to maintain a land-army equal to all contingencies, had also to decide to protect its ever-growing and expanding economic relations over the seas by building a navy strong enough to nip in the bud any temptation, on the part of any enemy, to crush our economic competition by force. Our navy, the creation of our Emperor, is, in this sense, the keystone in the mighty system to

which is due the extraordinary development of wealth in Germany, and which to-day constitutes the basis for the existence of the German people."

I give you that paragraph to think about some time when you are reading a discussion on the one battleship program in Congress or when you have presented to you what was presented to me the other day, the idea of an agitation to do away with all appropriations for battleships and have the government contribute the amount to sustaining and educating babies in the United States! That is not a joke; there is such an organization in existence in this country.—*The Iron Age.*

THE ROYAL NAVAL RESERVE.—The order calling for the immediate mobilization of the Royal Naval Reserve of Great Britain has once more brought into the limelight this little understood section of the British naval forces. Generally speaking, in all countries in which military service is compulsory, the population which earns its livelihood at sea, whether as merchant sailors or as fishermen, is drafted for service in the navy. Once the period of active service which lasts from four to five years is completed, seamen are drafted into the reserve and are liable for service at any moment until the age of about fifty. In Great Britain, where no compulsory military service exists, the crews of naval ships are composed of volunteers the same as in this country, and, after five years' service at sea, naval seamen for another five years form part of what is known as the Royal Fleet Reserve. The Royal Fleet Reserve is mobilized annually for the maneuvers and the celerity with which the British fleet was able to put to sea at the first intimation of a war threat is explained by the fact that the ships had just been mobilized for drill with a full complement of Royal Fleet Reserve men, the annual maneuvers having been abandoned this year in order to husband the oil fuel supply depleted by reason of the troubles in Mexico. The Royal Naval Reserve of Great Britain is a sort of militia composed entirely of seamen, officers, and engineers regularly employed in the British Merchant Service and, generally, in the finest class of passenger liners plying from British ports. The Royal Naval Reserve was created in 1860 and has since then endured many vicissitudes, having at times been almost on the point of being disbanded by naval administrations hostile to it. For the past ten years, however, the Royal Naval Reserve has enjoyed the favor of the British naval authorities and its organization has been radically altered so as to make it a powerful adjunct to the active personnel of the navy, which goal has undoubtedly been obtained. The Royal Naval Reserve is mustered annually on the drill ships stationed at the principal ports of the coast of the United Kingdom. The only case of a colonial branch of the Reserve is to be found in Newfoundland, where excellent material is recruited among the fishermen and drafted for drill yearly in one of the British cruisers stationed in North America. The regulations in force concerning the admission of seamen, officers and engineers in the Royal Naval Reserve are very stringent. The uniform worn by officers and men while on drill is, except for trifling details, identical with that of the active navy. Officers called out by Royal proclamation for war or other service in ships of the Royal Navy are granted allowances to provide the necessary equipment and are placed on precisely the same footing as naval officers of corresponding rank. A large number of Royal Naval Reserve officers have served a full twelve months in a seagoing man-of-war of the British Navy in regular commission and many are those who have besides obtained special certificates of proficiency in various ratings, such as navigation, gunnery, torpedo, submarine, signalling and other work. It is well known that officers of the British Merchant Service who happen to hold commissions in the Naval Reserve are very proud of their rank and neglect no opportunity to append the mystic initials R. N. R. after their names Masters of British ships holding a commission in the Naval Reserve and

having a certain number of Reserve men on board are allowed by Admiralty warrant to fly the blue ensign. So far only four men have been honored with a captain's commission in the Royal Naval Reserve, two of them being, respectively, Captain C. A. Bartlett, marine superintendent of the White Star Line, and Captain H. J. Haddock, commanding the White Star liner *Olympic*. Quite a number of commanders are to be found on the active list of the Reserve, one of the ordinary qualifications for promotion being the holding of the command of a British ocean-going passenger steamer of not less than 4000 tons for three years. Twelve officers now on the active list of commanders have not held command of passenger ships, but they have special service to their credit. It is, however, doubtful whether any masters of cargo vessels hold the rank of Commander R. N. R. The lower deck ratings of the Royal Naval Reserve are composed of seamen, firemen and coal passers, including several thousand fishermen. On attaining the age of 60, qualified R. N. R. seamen receive a pension equivalent to about $60 a year. Pursers of large liners are also admitted in the Reserve in the capacity of paymasters. The Royal Naval Reserve of Great Britain could not have been made possible except for the cordial support accorded to it by the large British steamship companies who, in most cases, facilitate the necessary absence of officers for the purpose of attending drills and even continue paying their officers when absent on such drills. Only two steamships, the Cunard liners *Lusitania* and *Mauretania*, receive a special Admiralty subvention for special service as Royal Naval Reserve cruisers in time of war. However, the British Admiralty possess, by virtue of private contracts, the right of hire or pre-emption over all the vessels of the Cunard Steamship Co. and of the International Mercantile Marine Co., in the case of those flying the British flag. The British mail contracts contain a clause giving the Admiralty rights of hire or pre-emption over the vessels employed as mail packets by the following steamship companies: Pacific Steam Navigation Co., Royal Mail Steam Packet Co., P. & O. Steam Navigation Co., Union-Castle Mail Steamship Co., and various cross-Channel and coastwise lines. These vessels should not be confounded with those armed by the British Admiralty for defensive purposes only, of which there are now 40 afloat. These vessels, which are engaged in carrying foodstuffs, are fitted with two 4.7-inch guns each, the expense of installing the guns being defrayed by the Admiralty. The commanders of such vessels are not officers under the Admiralty, the crews are not under naval discipline, and no conditions are enforced that a certain proportion of officers and crew of the armed merchantmen shall have served in the navy. Up to the present time there has been no difference between the insurance rates on cargoes carried in merchant vessels armed by the Admiralty and those on cargoes carried in unarmed vessels. It is impossible to say whether there will now be any difference in insurance rates on armed and unarmed merchantmen, as the rates will be dependent on a number of conditions that cannot now be foreseen. The 4.7-inch British naval gun weighs about 3½ tons complete with shield and throws a projectile weighing 45 pounds. It can fire 12 rounds per minute and has a penetrating power of 5 inches of hard steel plate at 3000 yards. As the small German cruisers which are believed to have been designed to harass British shipping are plated with 2-inch steel only, and mount 4.1-inch guns which throw a shell weighing 35 pounds, it is believed that British vessels fitted with the two 4.7-inch guns lent by the Admiralty will not be helpless in case of attack.—*Shipping Illustrated.*

PRÉCIS OF STREFFLEUR'S MILITÄRBLATT. By Lieutenant H. W. Roberts, R. G. A.—*The Struggle for Supremacy in the North Sea.*—The situation in the North Sea has changed very much in the last 40 years; formerly England was all-powerful and owned most of the commercial shipping, which was safe from capture owing to the supremacy of the British fleet; nowadays, however, the mercantile marine of Germany is very large and in-

creases from year to year, while her navy is of such a size as to threaten England's supremacy on the North Sea. A large number of experts who have considered the matter do not express the opinion that hostilities between the two powers are inevitable, but it is interesting to consider what might happen should war actually occur.

Practically every writer on the subject is of the opinion that England would take the initiative in the event of hostilities breaking out.

The naval bases and points of attack of both nations lie on the North Sea, and we may take it for granted that this sea will be the theater of war, and that no other places need even be considered. It is unnecessary, in fact it is impossible, for Germany to protect her colonies or to look after her interests in other seas, and she is thus in a position to concentrate her whole navy; the case of England is, however, different, as she cannot afford to neglect her interests in other parts of the world.

An invasion is highly improbable, as Germany is too weak on sea to risk such an undertaking, and England is too weak on land to make such a course of action advisable.

Should, however, a naval battle take place, the consequences of defeat are far more dangerous to England than to Germany, since the latter might then be able to invade Great Britain, whereas it is difficult to imagine the practicability of England landing troops in Germany.

In such a war the blockade of the enemy's coast and the capture of his merchant ships would play a large part. In this respect the advantage is all on the side of England, as a German cruiser breaking through the English line has to steam about 750 miles before reaching an important trade route. The problem for the British fleet is, however, not very easy, as the German merchant ships can easily gain a great advantage by steaming along in neutral waters. The blockade of the German coast can either be carried on from near the coast or at a very much greater distance. In the former case the British fleet would have to be scattered over a front of 130 miles; such a course of action would be impracticable, as the blockading ships would be constantly exposed to attack by torpedo craft, and the German fleet might easily break through; then again ships could pass through the Kaiser Wilhelm Canal and get behind the blockading line via the Kattegat and Skagerak.

It would of course be possible to block the 55 mile outlet from the Skagerak, but in this case the blockading ships would be 400 miles from their base, and the German merchant ships could take advantage of the neutral waters of Denmark and Norway. The only method of blockade which promises success is closing the entrance to the North Sea along the 59th degree parallel of latitude. In this case one end of the line at least is based in home waters.

Of course a blockade would only take place in the event of Germany being defeated on the high seas or avoiding a battle altogether; such courses of action do not appear probable to us, in spite of the opinion to the contrary held in England.

In conclusion, it is interesting to compare the naval strength of each country:

	Dread-noughts	Other Battleships	Battle Cruisers	Armored Cruisers	Other Cruisers	Torpedo Craft
England.....	33	39	9	34	81	379
Germany.....	19	20	7	9	14	256

—*The Journal of the Royal Artillery.*

CURRENT NAVAL AND PROFESSIONAL PAPERS

NOTE.—Lack of space limits the scope of these references. Upon application, members of the Institute, who wish to investigate further, any naval or military topic, will be supplied with fuller references to current periodicals published in both the United States and foreign countries.

UNITED STATES

THE NORTH AMERICAN REVIEW.—**August.**—The Future of Austria-Hungary, by *Sydney Brooks.*

THE AMERICAN REVIEW OF REVIEWS. **August.**—How our Navy Took First Rank in Gunnery, by *H. W. Lanier.* Prospects of Greater Greece, by *T. L. Stoddard.*

SCIENTIFIC AMERICAN. **July 11.**—The Internal Combustion Motor in the Field of Aviation, by *H. Huntington.* **July 18.**—The Paul Schmitt Biplane. **August 1.**—The Aeroplane in War, by *Major W. S. Brancker, R. A.* Wireless Telegraphy (A Comprehensive Review of the Various Systems), by *H. Fothergill.* **August 8.**—The Diesel Engine. Proposed Enlargement of the Norfolk Navy Yard. The Sperry Gyroscopic Stabilizer. **August 15.**—The Air Bomb, by *Steinmetz and Dienstbach.* **August 22.**—Russia's Giant War Flyers, by *Major H. Bannerman-Phillips.* Submarine and Dreadnought. The Prospects of Aerial Fighting in the Present War. **August 29.**—Night Landing Signals for War Aeroplanes. A Century of Dreadnoughts. Aerial Reconnaissance During Sieges. **September 5.**—Germany as an Industrial Power. German Submarine Boats. Artillery for Airship Attack. Exploding Mines by Wireless Telegraphy. Modern Turret Fortifications. Throwing Military Messages from Aeroplanes. Sixteen Million Men Under Arms. The Armament of the Warring Nations. Feeding the Man on the Firing Line. The Nerves of an Army. From Fighting Line to Hospital. Aircraft in War. A Comparison of Naval Strength. Germany's Bid for Naval Supremacy. **September 12.**—Lighthouses for Aerial Navigation. The First Naval Engagement of the War. Navigation Without Logarithms.

JOURNAL OF THE AMERICAN SOCIETY OF NAVAL ENGINEERS. **August.**—The American Society of Naval Engineers—Its Origin, Scope and Purpose, by *Rear Admiral J. R. Edwards, U. S. N.* The Engineering Experiment Station, by *Lieutenant H. G. Bowen, U. S. N.,* and *Leo Loeb, Mechanical Engineer.* Optical Glass, by *Lieutenant F. J. Cleary, U. S. N.* Method of Mending Crack in Cylinder Flange, by *Captain F. W. Bartlett, U. S. N.* The Dynamical Equivalent of Heat, by *Rear Admiral John Lowe, U. S. N., Retired.* The Present Status of Airships in Europe, by *Jerome C. Hunsaker, Assistant Naval Constructor, U. S. N.* The New Cooke-Pollen Range-Finder, by *E. Wilfred Taylor.* Submarine Signalling, by *Lieutenant (J. G.) W. R. Carter, U. S. N.* Notes on Evaporating Plants, by *Lieutenant Commander H. C. Dinger, U. S. N.* Corrosion of Common Metals and Methods of Prevention, by *Ensign S. J. Zeigler, Jr., U. S. N.* U. S. S. *McDougal,* by *Henderson B. Gregory.* Some Phenomena of Radio Telegraphy, by *Ensign Harold E. Saunders, U. S. N.* Notes on Aeroplane Stabilization, by *William L. Cathcart.* Notes on Submarine Repairs and Operation, by *Lieutenant C. N. Hinkamp, U. S. N.* Inter-Ship Communication by Submarine Signalling, by *William L. Cathcart.*

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ENGINEERING. **July 3.**—The New Armstrong Naval Shipbuilding Yard (Illustrated). The Testing of Turbo-Dynamos. **July 17.**—The New Niclausse High Duty Marine-Type Boiler. Balancing Internal Combustion Engines. **July 24.**—The Turkish Naval Construction Works. Japanese Institution of Naval Architects. The Republics of Central and South America.

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LE YACHT. **July 11.**—L'Avenir de la Vapeur, par *L. Robida.* **July 25.**—Les Croiseurs. Cuirassés Mediterranéens. Note sur L'Emploi des Sous-Marins. Actuels dans la Bataille Navale. **August 8.**—A propos des éclaireurs d'escadrilles. La question de la ventilation des navires de combat; le système du contact direct. La première attaque des torpilleurs japonais à Port-Arthur. Recherche des flottaisons en position inclinée, *L. Cognet.*

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MARINE RUNDSCHAU. **July.**—Der geschichtliche Aufbau der Stellung Englands im Mittelmeer, von *Vizeadmiral a. D. Freiherrn v. Maltzahn.* Führereigenschaften und Führererziehung, von *Generalmajor v. Wenninger.* Die politischen Parteien in Japan und ihre Stellung zu den Wehrfragen, von *Major Dr. Karl Haushofer.*

UEBERALL. **August.**—Zum Gedenken des 5. August 1864; Farragut und die Schlacht bei Mobile, von *Vizeadmiral z. D. Hermann Kirchhoff,* Kiel. Der Einfluss der Waffenentwicklung auf den Kampfschiffstyp, vom *Fregattenkapitän a. D. P. Hilbrand.*

AUSTRIA

MITTEILUNGEN AUS DEM GEBIETE DES SEEWESENS. **July.**—Die Anforderungen an den osterreichisch-ungarischen Schiffbau. Der Torpedo und seine Vewendung im Kriege.

ITALY

REVISTA MARITTIMA. **June.**—Osservazioni sulle ricerche dei dati evolutivi delle moderne navi da battaglia, *Guido Po, Tenente di vascello.* Efficacia dello shrapnel nel tiro dalle navi e dalle torpediniere, *E. D. S.* La radiotelegrafia a bordo degli aeroplani e dirigibili, *Attilio Brauzzi, Tenente di vascello.* **July.**—La nave di linea (note ed appunti), *Ing. Leonardo Fea, Capitano del Genio Navale.* Polveriere navali moderne, *E. Pinelli, Capitano di vascello.*

EUROPEAN WAR NOTES*

Compiled by LIEUTENANT C. C. GILL, U. S. Navy

GENERAL ARRANGEMENT

1. DIPLOMATIC NOTES.
2. NAVAL NOTES.
3. MISCELLANEOUS NOTES.

(Details of Land Operations are not included.)

[Events of international significance will be briefly chronicled in large type. Notes and comments bearing upon these events will be interspersed in smaller type. Addenda will be published in future issues to correct and complete this compilation.]

DIPLOMATIC NOTES

On **June 28** Archduke Franz Ferdinand, the heir apparent of Austria-Hungary, and his wife were assassinated in an automobile on a public street of Serajevo, the capital of Bosnia, a province taken by Austria from Turkey in 1909.

The history of Austria's acquisition of Bosnia and Herzegovina is as follows:

Bosnia, previous to 1878 the northwesternmost portion of the Turkish Empire, is now (1902), with Herzegovina, virtually a province of Austria-Hungary. . . . The facts of Turkish misgovernment were recognized at the Congress of Berlin (1878), and Austria-Hungary was authorized to occupy and administer Bosnia and Herzegovina, though the Sultan retained the nominal suzerainty over them. The Austro-Hungarian occupation was effected in 1878, but only after a desperate resistance on the part of the Mohammedan inhabitants. . . . Bosnia has made great strides under Austro-Hungarian rule, its prosperity being in great measure due to the wise and vigorous administration of Baron Kallay. The proclamation by the Emperor Francis Joseph of Austria formally announcing the practical annexation of Bosnia and Herzegovina was made public in the fall of 1908. This proclamation extended the rights of succession and sovereignty over the provinces and granted them a constitution and special Diet. On January 12, 1909, Turkey accepted from Austria $10,800,000 as indemnity for the annexation. In addition Austria abandoned her rights in Novi-Bazar, agreed to the suppression of Austrian post-offices in Turkish territory and made other concessions.—*Army and Navy Journal.*

Russia made diplomatic protest against this transfer, but Germany threw her vast military strength behind Austria, and owing to the fact that Russia was in no condition for war she was forced to submit, though the affair has always rankled.

*Acknowledgment is made to A. F. Westcott, Ph. D., Instructor U. S. Naval Academy, for help given in making this compilation.

Following a secret investigation, the Austrian Government declared that the evidence showed the murder to be the result of an elaborate plot hatched in Belgrade, the capital of Servia. Consequently, on **July 23**, the Austro-Hungarian Minister at Belgrade presented a Note to the Servian Government reciting instances of Servian disaffection and demanding with stringent provisions that Servian propaganda against Austria-Hungary should cease, and that Austrian officials should be permitted to take prominent part in the investigation of the plots resulting in the assassination of the heir apparent and to assist in bringing the criminals to justice.

The Austrian Note is in the following terms:

"On March 31, 1909, the Royal Servian Minister in Vienna, on the instructions of the Servian Government, made the following statements to the Imperial and Royal Government:

"'Servia recognizes that the *fait accompli* regarding Bosnia has not affected her rights, and consequently she will conform to the decisions that the powers will take in conformity with Article 25 of the Treaty of Berlin. At the same time that Servia submits to the advice of the powers, she undertakes to renounce the attitude of protest and opposition which she has adopted since October last. She undertakes, on the other hand, to modify the direction of her policy with regard to Austria-Hungary and to live in future on good neighborly terms with the latter.'

"The history of recent years, and in particular the painful events of June 28 last, have shown the existence in Servia of a subversive movement with the object of detaching a part of Austria-Hungary from the Monarchy. The movement, which had its birth under the eyes of the Servian Government, has had consequences on both sides of the Servian frontier in the shape of acts of terrorism, and a series of outrages and murders.

"Far from carrying out the formal undertakings contained in the declaration of March 31, 1909, the Royal Servian Government has done nothing to repress these movements. It has permitted the criminal machinations of various societies and associations and has tolerated unrestrained language on the part of the press, apologies for the perpetrators of outrages and the participation of officers and functionaries in subversive agitation. It has permitted an unwholesome propaganda in public instruction. In short, it has permitted all the manifestations which have incited the Servian population to hatred of the Monarchy and contempt of its institutions.

"This culpable tolerance of the Royal Servian Government had not ceased at the moment when the events of June 28 last proved its fatal consequences to the whole world.

"It results from the depositions and confessions of the criminal perpetrators of the outrage of June 28 that the Serajevo assassinations were hatched in Belgrade, that the arms and explosives with which the murderers were provided had been given to them by Servian officers and functionaries belonging to the Narodna Obrana, and finally that the passage into Bosnia of the criminals and their arms was organized and effected by the chiefs of the Servian frontier service.

"The above-mentioned results of the magisterial investigations do not permit the Austro-Hungarian Government to pursue any longer the attitude of expected forbearance which it has maintained for years in face of the machinations hatched in Belgrade and thence propagated in the territories of the Monarchy.

"The results, on the contrary, impose on it the duty of putting an end to the intrigues which form a perpetual menace to the tranquillity of the Monarchy.

"To achieve this end the Imperial Royal Government sees itself compelled to demand from the Royal Servian Government a formal assurance that it condemns these dangerous propaganda against the Monarchy, the aim of which is to detach from the Monarchy territories belonging to it, and that it undertakes to suppress by every means this criminal and terrorist propaganda.

"In order to give a formal character to this undertaking the Royal Servian Government shall publish on the front page of its *Official Journal* for July 26 the following declaration:

"'The Royal Government of Servia condemns the propaganda directed against Austria-Hungary, *i. e.*, the ensemble of tendencies of which the final aim is to detach from the Austro-Hungarian Monarchy territories belonging to it, and it sincerely deplores the fatal consequences of these criminal proceedings. The Royal Government regrets that Servian officers and functionaries participated in the above-mentioned propaganda and thus compromised the good neighborly relations to which the Royal Government was solemnly pledged by its declaration of March 31, 1909. The Royal Government, which disapproves and repudiates all idea of interfering or attempting to interfere with the destinies of the inhabitants of any part whatsoever of Austria-Hungary, considers it its duty formally to warn officers and functionaries, and the whole population of the Kingdom, that henceforward it will proceed with the utmost rigor against persons who may be guilty of such machinations, which it will use all its efforts to anticipate and suppress. This declaration shall simultaneously be communicated to the Royal Army as an Order of the Day by His Majesty the King and shall be published in the *Official Bulletin* of the army.

"'*Points of Redress.*—The Royal Servian Government further undertakes (1) to suppress any publication which incites to hatred and contempt of the Austro-Hungarian Monarchy and the general tendency of which is directed against its territorial integrity; (2) to dissolve immediately the society styled Narodna Obrana, to confiscate all its means of propaganda, and to proceed in the same manner against other societies and their branches in Servia which are addicted to propaganda against the Austro-Hungarian Monarchy. The Royal Government shall take the necessary measures to prevent the societies dissolved from continuing their activity under another name and form; (3) to eliminate without delay from public instruction in Servia, not only as regards the teaching body, but also as regards the methods of instruction, everything that serves, or might serve, to foment the propaganda against Austria-Hungary; (4) to remove from the military service, and from the administration in general, all officers and functionaries guilty of propaganda against the Austro-Hungarian Monarchy whose names and deeds the Austro-Hungarian Government reserves to itself the right of communicating to the Royal Government; (5) to accept the collaboration in Servia of representatives of the Austro-Hungarian Government in the suppression of the subversive movement directed against the territorial integrity of the Monarchy; (6) to take judicial proceedings against accessories to the plot of June 28 who are on Servian territory. Delegates of the Austro-Hungarian Government will take part in the investigation relating thereto; (7) to proceed without delay to the arrest of Major Voija Tankcasitch and of the individual named Milan Ciganovitch, a Servian State employee, who have been compromised by the results of the magisterial inquiry at Serajevo; (8) to prevent by effective measures the co-operation of the Servian authorities in the illicit traffic in arms and explosives across the frontier, to dismiss and punish severely officials of the frontier service at Schabatz and Loznica guilty of having assisted the perpetrators of the Serajevo crime by facilitating the passage of the frontier for them; (9) to furnish the Austro-Hungarian Government with explanations regarding the unjustifiable utterances of high

Servian officials, both in Servia and abroad, who, notwithstanding their official position, did not hesitate after the crime of June 28 to express themselves in interviews in terms of hostility to the Austro-Hungarian Government, and, finally (10) to notify the Austro-Hungarian Government without delay of the execution of the measures comprised under the preceding heads. The Austro-Hungarian Government expects the reply of the Servian Government at the latest by 6 o'clock on Saturday evening, the 25th of July.'"

On **July 24** Servia presented the following reply to the Austrian Note, apparently agreeing to a majority of Austria's demands, and proposing arbitration on those not accepted:

The Royal Servian Government has received the communication of the Imperial and Royal Austro-Hungarian Government of the 10th of this month, and it is persuaded that its reply will remove all misunderstanding tending to threaten or to prejudice the friendly and neighborly relations between the Austro-Hungarian Monarchy and the Kingdom of Servia.

The Royal Government is aware that the protests made both at the tribune of the National Skupshtina and in the declarations and the acts of responsible representatives of the State—protests which were cut short by the declaration of the Servian Government made on March 18—have not been renewed towards the great neighboring Monarchy on any occasion, and that since this time, both on the part of the Royal Governments which have followed on one another, and on the part of their organs, no attempt has been made with the purpose of changing the political and juridical state of things in this respect.

The Imperial and Royal Government has made no representations save concerning a scholastic book regarding which the Imperial and Royal Government has received an entirely satisfactory explanation. Servia has repeatedly given proofs of her pacific and moderate policy during the Balkan crises, and it is, thanks to Servia and the sacrifice she made, exclusively in the interest of the peace of Europe that this peace has been preserved. The Royal Government cannot be held responsible for manifestations of a private nature such as newspaper articles and the peaceful work of societies—manifestations which occur in almost all countries as a matter of course, and which as a general rule escape official control—all the less in that the Royal Government, when solving a whole series of questions which came up between Servia and Austria-Hungary, has displayed a great readiness to treat (*prevenance*), and in this way succeeded in settling the greater number to the advantage of the progress of the two neighboring countries.

It is for this reason that the Royal Government has been painfully surprised by the statements according to which persons of the Kingdom of Servia are said to have taken part in the preparation of the outrage committed at Serajevo. It expected that it would be invited to collaborate in the investigation of everything bearing on this crime, and it was ready to prove by its actions its entire correctness to take steps against all persons with regard to whom communications had been made to it, thus acquiescing in the desire of the Imperial and Royal Government.

Points of Compliance.—The Royal Government is disposed to hand over to the courts any Servian subject, without regard to his situation and rank, for whose complicity in the crime of Serajevo it shall have been furnished with proofs, and especially it engages itself to have published on the front page of the *Official Journal* of July 13-26 the following announcement:

"The Royal Servian Government condemns all propaganda directed against Austria-Hungary, that is to say, all tendencies as a whole of which the ultimate object is to detach from the Austro-Hungarian Monarchy territories which form part of it, and it sincerely deplores the fatal consequence of these criminal actions. The Royal Government regrets that Servian officers and officials should, according to the communication of the Imperial

and Royal Government, have participated in the above-mentioned propaganda, thereby compromising the good neighborly relations to which the Royal Government solemnly pledged itself by its declaration of the 31st of March, 1909. The Government, which disapproves and repudiates any idea or attempt to interfere in the destinies of the inhabitants of any part of Austria-Hungary whatsoever, considers it its duty to utter a formal warning to the officers, the officials, and the whole population of the kingdom that henceforth it will proceed with the utmost rigor against persons who render themselves guilty of such actions, which it will use all its efforts to prevent and repress."

This announcement shall be brought to the cognizance of the Royal Army by an Order of the Day issued in the name of His Majesty the King by H. R. H. the Crown Prince Alexander, and shall be published in the next official bulletin of the army.

(1) The Royal Government engages itself furthermore to lay before the next regular meeting of the Skupshtina an amendment to the Press Law punishing in the severest manner incitements to hate and contempt of the Austro-Hungarian Monachy, and also all publications of which the general tendency is directed against the territorial integrity of the Monarchy. It undertakes at the forthcoming revision of the Constitution to introduce in Article XXII of the Constitution an amendment whereby the above publications may be confiscated, which is at present categorically forbidden by the terms of Article XXII of the Constitution.

(2) The government does not possess any proof, nor does the Note of the Imperial and Royal Government furnish such, that the society Narodna Obrana and other similar societies have up to the present committed any criminal acts of this kind through the instrumentality of one of their members. Nevertheless the Royal Government will accept the demand of the Imperial and Royal Government and will dissolve the Narodna Obrana Society and any other society which shall agitate against Austria-Hungary.

(3) The Royal Servian Government engages itself to eliminate without delay from public instruction in Servia everything which aids or might aid in fomenting the propaganda against Austria-Hungary when the Imperial and Royal Government furnishes facts and proofs of this propaganda.

(4) The Royal Government also agrees to remove from the military service (all persons) whom the judicial inquiry proves to have been guilty of acts directed against the integrity of the territory of the Austro-Hungarian Monarchy, and it expects the Imperial and Royal Government to communicate at an ulterior date the names and the deeds of these officers and officials for the purposes of the proceedings which will have to be taken.

Austrian Collaboration.—(5) The Royal Government must confess that it is not quite clear as to the sense and object of the demands of the Imperial and Royal Government that Servia should undertake to accept on her territory the collaboration of delegates of the Imperial and Royal Government, but it declares that it will admit whatever collaboration which may be in accord with the principles of international law and criminal procedure, as well as with good neighborly relations.

(6) The Royal Government, as goes without saying, considers it to be its duty to open an inquiry against all those who are or shall eventually prove to have been involved in the plot of June 28, and who are in Servian territory. As to the participation at this investigation of agents of the Austro-Hungarian authorities delegated for this purpose by the Imperial and Royal Government, the Royal Government cannot accept this demand, for it would be a violation of the Constitution and of the law of criminal procedure. Nevertheless, in concrete cases it might be found possible to communicate the results of the investigation in question to the Austro-Hungarian representatives.

(7) On the very evening that the Note was handed in the Royal Government arrested Major Voislav Tankositch. As for Milan Ciganowitch, who is a subject of the Austro-Hungarian Monarchy, and who, until June 15,

was employed as a beginner in the administration of the railways, it has not yet been possible to (arrest) him. In view of the ultimate inquiry the Imperial and Royal Government is requested to have the goodness to communicate in the usual form as soon as possible the presumptions of guilt as well as the eventual proofs of guilt against those persons who have been collected up to the present in the investigations at Serajevo.

(8) The Servian Government will strengthen and extend the measures taken to prevent the illicit traffic of arms and explosives across the frontier. It goes without saying that it will immediately order an investigation, and will severely punish the frontier officials along the line Schabatz-Losnitza who have been lacking in their duties and who allowed the authors of the crime of Serajevo to pass.

(9) The Royal Government will willingly give explanations regarding the remarks made in interviews by its officials both in Servia and abroad after the attempt, and which, according to the statement of the Imperial and Royal Government, were hostile towards the Monarchy, as soon as the Imperial and Royal Government has (forwarded) it the passages in question of these remarks and as soon as it has shown that the remarks made were in reality made by the officials regarding whom the Royal Government itself will see about collecting proofs.

(10) The Royal Government will inform the Imperial and Royal Government of the execution of the measures comprised in the preceding points, in as far as that has not already been done by the present Note, as soon as each measure has been ordered and executed.

In the event of the Imperial and Royal Government not being satisfied with this reply the Royal Servian Government, considering that it is to the common interest not to precipitate the solution of this question, is ready as always to accept a pacific understanding either by referring this question to the decision of The Hague International Tribunal or to the Great Powers which took part in the drawing up of the declaration made by the Servian Government on March 18-31, 1909.

The Austrian Minister, after brief consideration, informed the Servian Government that the reply was considered unsatisfactory, and on **July 25** he abruptly left Servia, thus breaking diplomatic relations. The same day Austria handed the Servian Minister his passports and began to mass troops on the Servian frontier.

The following *communiqué* embodies the Austro-Hungarian semi-official view of the attitude adopted by Servia:

"Baron Giesl, the Austro-Hungarian Minister in Belgrade, presented the Servian Note in reply to our claim to the Minister of Foreign Affairs on his arrival in Vienna yesterday. The object of this Note is to create the false impression that the Servian Government is prepared in a great measure to comply with our demands. As a matter of fact, however, the Note is filled with the spirit of dishonesty which clearly lets it be seen that the Servian Government is not seriously determined to put an end to the culpable tolerance it has hitherto extended to the intrigues against the Monarchy.

"The Servian Note contains such far-reaching reservations and limitations, not only in regard to the general principles of our *démarche*, but also in regard to the individual claims which we have put forward, that the concessions actually made become insignificant. In particular our demand for the participation of the Austro-Hungarian authorities in the investigations to detect the accomplices in the conspiracy on Servian territory has been rejected. Our request that measures should be taken against that section of the press which is hostile to Austro-Hungary has been declined, and our wish that the Servian Government should take the necessary measures to prevent the dissolved Austrophobe associations from continu-

ing their activity under another name and in another form has not even been considered at all.

"Since the claims contained in the Austrian Note of July 23, regard being had to the attitude hitherto adopted by Servia, represent the minimum which is necessary for the establishment of a permanent peace in the South-Eastern Monarchy, the Servian answer must be regarded as unsatisfactory. That the Servian Government itself was conscious that its Note was not acceptable to us is proved by the circumstance that it proposes to us at the end of the Note to submit the dispute to arbitration, an invitation which is thrown into its proper light by the circumstance that three hours before the handing in of the Note, a few minutes before the expiry of the period, the mobilization of the Servian Army took place."

The *London Times* of July 27 gave the following summary of the Austro-Hungarian Note and the Servian reply:

(1) That the Servian Government give a formal assurance that it condemns Serb propaganda against the Monarchy;	ACCEPTED.
(2) That a declaration expressing this condemnation be published on the front page of the Servian *Official Journal* of Sunday next;	ACCEPTED.
(3) That the declaration shall also express regret that Servian officers and officials participated in the anti-Austrian propaganda;	ACCEPTED.
(4) That the Servian Government promises to proceed with the utmost rigor against all who may be guilty of such machinations;	ACCEPTED.
(5) That this declaration be simultaneously communicated by the King of Servia to his army as an order of the day, and be published in the *Official Bulletin* of the army;	ACCEPTED.
(6) That all Servian publications which incite to hatred and contempt of Austria-Hungary be suppressed;	ACCEPTED.
(7) That a society styled the *Narodna Obrana* (National Union) be dissolved and its means of propaganda confiscated;	ACCEPTED.
(8) That teachers and methods of education in Servia which tend to foment feeling against Austria-Hungary be eliminated;	ACCEPTED.
(9) That all officers and officials guilty of propaganda against Austria-Hungary be dismissed from the service, the Austro-Hungarian Government reserving itself the right to communicate to Servia the names and doings of such officers and officials;	ACCEPTED SUBJECT TO PROOF.
(10) That representatives of Austria-Hungary shall assist Servia in suppressing in Servia the movement directed against the territorial integrity of the Dual Monarchy and take part in the judicial proceedings on Servian territory against persons accessory to the Serajevo crime;	REJECTED CONDITIONALLY.
(11) That Servia furnish the Austro-Hungarian Government with explanations in regard to the utterances of high Servian officials in Servia and abroad who ventured to speak ill of the Austro-Hungarian Government after the Serajevo crime;	ACCEPTED CONDITIONALLY.

If the reply be deemed unsatisfactory arbitration or mediation is proposed.

At this crisis Russia requested Germany to use her influence in restraining Austria, and Sir Edward Grey on behalf of Great Britain addressed diplomatic notes to the Powers urging that Great Britain, Germany, France, and Italy unite in conference to adjust Austria-Servian difficulties. France and Italy agreed to this proposition, but Germany did not give her complete assent. No further steps toward peaceful adjustment in this way could be taken since the co-operation of all four powers was essential.

Sir Edward Grey in the House of Commons explained the attitude of Great Britain in the Austro-Servian crisis as follows:

"Last Friday morning I received from the Austro-Hungarian Ambassador the text of the communication made by the Austro-Hungarian Government to the powers, which has appeared in the press, and which included textually the demand made by the Austro-Hungarian Government upon Servia.

"In the afternoon I saw other Ambassadors, and expressed the view that as long as the dispute was one between Austria-Hungary and Servia alone I felt that we had no title to interfere, but that if the relations between Austria-Hungary and Russia became threatening, the question would then be one of the peace of Europe—a matter that concerned us all.

"I did not then know what view the Russian Government had taken of the situation, and without knowing how things were likely to develop I could not make any immediate proposition; but I said that if relations between Austria-Hungary and Russia did become threatening, the only chance of peace appeared to me to be that the four powers—Germany, France, Italy, and Great Britain—who were not directly interested in the Servian question, should work together both in St. Petersburg and Vienna simultaneously to get both Austria-Hungary and Russia to suspend military operations while the four powers endeavored to arrange a settlement.

"After I had heard that Austria-Hungary had broken off diplomatic relations with Servia I made by telegraph yesterday afternoon the following proposal, as a practical method of applying the views that I had already expressed:

"I instructed His Majesty's Ambassadors in Paris, Berlin, and Rome to ask the governments to which they were accredited whether they would be willing to arrange that the French, German, and Italian Ambassadors in London should meet me in a conference to be held in London immediately to endeavor to find a means of arranging the present difficulties. At the same time I instructed His Majesty's Ambassadors to ask those governments to authorize their representatives in Vienna, St. Petersburg, and Belgrade to inform the governments there of the proposed conference and to ask them to suspend all active military operations pending the result of the conference.

"To that I have not yet received complete replies, and it is of course a proposal in which the co-operation of all four powers is essential. In a crisis so grave as this the efforts of one power alone to preserve the peace must be quite ineffective."

In reply to a question by Mr. Harry Lawson, Sir Edward Grey said he understood that the German Government were in favor of the idea of mediation in principle as between Austria-Hungary and Russia. He had not, however, yet received the reply of the German Government to the particular proposal of applying the principle by means of a conference.—*London Times.*

On **July 27** Austria formally declared war against Servia and opened hostilities.

The following official announcement was made in Vienna about 7.30 p. m. July 25:

"The Servian Prime Minister, M. Pashitch, visited the Imperial and Royal Legation in Belgrade a few minutes before 6 o'clock and gave an inadequate answer to our Notes. Baron Giesl (the Austro-Hungarian Minister) thereupon notified him that diplomatic relations had been broken off, and left Belgrade with the staff of the Legation at 6.30. The Servian Government had at 3 o'clock in the afternoon ordered the mobilization of the whole army. The court, the government, and the troops are leaving Belgrade. The government is to be transferred to Kraguievatz."

The Austro-Hungarian Government's declaration of war against Servia is worded as follows:

"The Royal Government of Servia not having given a satisfactory reply to the Note presented to it by the Austro-Hungarian Minister in Belgrade on July 23, 1914, the Imperial and Royal Government of Austria-Hungary finds it necessary itself to safeguard its rights and interests and to have recourse for this purpose to force of arms. Austria-Hungary therefore considers itself from this moment in a state of war with Servia."

The Ministry for Foreign Affairs addressed to the foreign representatives in Vienna a verbal Note informing them of the formal declaration of war against Servia, and declaring that Austria-Hungary would on the assumption of similar observance on the part of Servia, adhere to the provisions of The Hague Convention of October 18, 1908, and those of the Declaration of London of February 26, 1909.—*Reuter.*

Slavic sentiment bent Russian sympathy toward Servia, and on **July 28** an Imperial Ukase to mobilize Russian troops was received with popular enthusiasm. Other European powers principally interested, while endeavoring to localize the conflict, took precautionary naval and military measures: the British fleet assembled off Portland and sailed under sealed orders; Germany and France prepared to mobilize their respective armies.

On **July 29** the Austrian Army bombarded Belgrade and invaded Servia, whereupon Russia began to mass troops on the German and Austrian frontiers.

On **July 30** Germany demanded that Russia stop mobilizing and declare her intentions.

On July 31 the Tsar sent to the Kaiser the following telegram:

"I thank thee from my heart for thy mediation, which leaves a gleam of hope that even now all may end peacefully. It is technically impossible to discontinue our military operations, which are rendered necessary by Austria's mobilization. We are far from wishing for war, and so long as the negotiations with Austria regarding Servia continue, my troops will not undertake any provocative action. I give thee my word upon it. I trust with all my strength in God's grace, and I hope for the success of thy mediation at Vienna and for the welfare of our countries and the peace of Europe.—Thy most devoted NICHOLAS.

To this the Emperor replied:

"In answer to thy appeal to my friendship and thy prayer for my help I undertook mediatory action between the Austro-Hungarian Government and thine. While this action was in progress thy troops were mobilized

against my ally, Austria-Hungary, in consequence of which, as I have already informed thee, my mediation was rendered nearly illusory. Nevertheless I have continued it. Now, however, I receive trustworthy news of your serious preparations for war, even on my Eastern frontier. The responsibility for the safety of my kingdom compels me to take definite retaliatory measures. My efforts to maintain the peace of the world have now reached their utmost possible limit. It will not be I who am responsible for the calamity which threatens the whole civilized world. Even at this moment it lies in thy power to avert it. Nobody threatens the honor and power of Russia, which could well have waited for the result of my mediation. The friendship which I inherited from my grandfather on his deathbed for thee and thy kingdom has always been holy to me. I have remained true to Russia whenever she has been in sore straits, and especially during her last war. The peace of Europe can still be maintained by thee if Russia decides to cease her military measures, which threaten Germany and Austria-Hungary."

Following is an interchange of personal telegrams between King George of England and the Russian Emperor.

The first communication from King George is dated August 1.

"My government has received the following statement from the German Government:

"'On July 29 the Russian Emperor requested the German Emperor by telegraph to mediate between Russia and Austria. The Emperor immediately declared his readiness to do so. He informed the Russian Emperor of this by telegraph, and took the required action at Vienna. Without waiting for the result of this action Russia mobilized against Austria. By telegraph the German Emperor pointed out to the Russian Emperor that hereby his attempt at mediation would be rendered illusory. The Emperor further asked the Russian Emperor to suspend the military operations against Austria. This, however, did not happen. In spite of this the German Government continued its mediation in Vienna. In this matter the German Government has gone to the furthest limit of what can be suggested to a sovereign State which is the ally of Germany. The proposals made by the German Government in Vienna were conceived entirely on the lines suggested by Great Britain, and the German Government recommended them in Vienna for their serious consideration. They were taken into consideration in Vienna this morning. During the deliberations of the (? Austrian) eabinet, and before they were concluded, the German Ambassador in St. Petersburg reported the mobilization of the entire Russian Army and fleet. Owing to this action on the part of Russia, the Austrian answer to the German proposals for mediation, which were still under consideration, was not given. This action on the part of Russia is also directed against Germany—that is to say, the power whose mediation had been invoked by the Russian Emperor. We were bound to reply with serious counter measures to this action, which we were obliged to consider as hostile, unless we were prepared to endanger the safety of our country. We are unable to remain inactive in face of the Russian mobilization on our frontier. We have therefore informed Russia that, unless she were prepared to suspend within 12 hours the war-like measures against Germany and Austria, we should be obliged to mobilize, and this would mean war. We have asked France if she would remain neutral during a German-Russian war.

"I cannot help thinking that some misunderstanding has produced this deadlock. I am most anxious not to miss any possibility of avoiding the terrible calamity which at present threatens the whole world. I therefore make a personal appeal to you to remove the misapprehension which I feel must have occurred, and to leave still open grounds for negotialtion and possible peace. If you think I can in any way contribute to that all-important purpose I will do everything in my power to assist in reopening the interrupted conversations between the powers concerned. I feel confident

that you are as anxious as I am that all that is possible should be done to secure the peace of the world."

Reply of His Imperial Majesty the Emperor of Russia to His Majesty King George:

"I would gladly have accepted your proposals had not the German Ambassador this afternoon presented a note to my government declaring war. Ever since presentation of the ultimatum at Belgrade, Russia has devoted all her efforts to finding some pacific solution of the question raised by Austria's action. Object of that action was to crush Servia and make her a vassal of Austria. Effect of this would have been to upset balance of power in Balkans, which is of such vital interest to my empire. Every proposal, including that of your government, was rejected by Germany and Austria, and it was only when favorable moment for bringing pressure to bear on Austria had passed that Germany showed any disposition to mediate. Even then she did not put forward any precise proposal. Austria's declaration of war on Servia forced me to order a partial mobilization, though, in view of threatening situation, my military advisers strongly advised general mobilization owing to quickness with which Germany can mobilize in comparison with Russia. I was eventually compelled to take this course in consequence of complete Austrian mobilization, of the bombardment of Belgrade, of concentration of Austrian troops in Galicia, and of secret military preparations being made in Germany. That I was justified in doing so is proved by Germany's sudden declaration of war, which was quite unexpected by me, as I had given most categorical assurances to the Emperor William that my troops would not move so long as mediation negotiations continued.

"In this solemn hour I wish to assure you once more that I have done all in my power to avert war. Now that it has been forced on me, I trust your country will not fail to support France and Russia. God bless and protect you."—*Boston Transcript.*

Russia's reply stating that it was technically impossible to stop mobilization was not satisfactory to the German Government and the Kaiser proclaimed martial law, declaring that a state of war existed in Germany.

On **August 1** Germany declared war on Russia, whereupon France prepared for war and began the mobilization of her army.

On **August 2** Germany not being satisfied as to France's intentions, invaded the neutral state of Luxembourg and requested Belgium to permit the passage of German troops. Belgium replied that she would resist the infringement of her neutrality with the force of arms.

The French Premier and Minister for Foreign Affairs, M. Viviani, addressed to the Ministry of the Republic in Luxembourg the following telegram:

"Please declare to the President of the Council that, in accordance with the Treaty of London of 1867, the Government of the Republic intended to respect the neutrality of the Grand Duchy of Luxembourg, as it has shown by its attitude. The violation of this neutrality by Germany is, however, of a nature which compels France to take henceforth the measures in this respect required by her defence and interests."

The Prime Minister of Luxembourg has protested to the German Government, and has brought this protest to the notice of the German Embassy in Paris, stating the following facts:

On Sunday, August 2, early in the morning, the Germans entered Luxembourg territory by the bridges of Wasserbourg (?) and Remich, proceeding towards the south of the country and Luxembourg, its capital. They have also brought towards this point armored trains, with troops and munitions of war. Further, the special French Commissioner at Petitcroix has announced to the Sûreté Générale that the Germans have just opened fire on the frontier station of Delle-Petitcroix. Two German cavalry officers have just been killed at Roncray and Boxson, 10 kilometers on our side of the frontier.—*London Times.*

On **August 2** German forces invaded Belgium, whereupon Belgium appealed to England and France for support and prepared to resist the German advance.

This was followed **(August 3)** by declarations of war which were interchanged between Germany on one side and France and England on the other. Up to the last moment diplomatic efforts were made to preserve peace and to shift responsibility for war-like moves.

OFFICIAL RECORD.—One of the most important collections of diplomatic correspondence ever made public was issued by the British Foreign Office in the form of a Blue-book [No. 6 (1914)].

Austria and Servia.—On July 25 an important dispatch was received from the British Ambassador in St. Petersburg summarizing a conversation with the Russian Foreign Minister. M. Sazonoff expressed the belief that Austrian action was in reality directed against Russia. He did not believe that Germany really wanted war, but her attitude would be decided by that of England. If England took her stand firmly with France and Russia there would be no war. Otherwise rivers of blood would flow, and England would in the end be dragged to war. The British Ambassador argued that England could mediate more effectively as a friend who, if her counsels of moderation were disregarded, might be converted into an ally, than if she were to declare herself Russia's ally at once. M. Sazonoff replied "that, unfortunately, Germany was convinced that she could count upon British neutrality."

On July 26 the British Ambassador in Vienna reported the confident belief of the German Ambassador, Herr von Tschirschky, that Russia would keep quiet during the chastisement of Servia, "because Russia would not be so imprudent as to take a step which would probably result in questions such as the Swedish, Polish, Ruthene, Roumanian, and Persian questions being brought into the melting pot. France, too, was not at all in a condition for facing a war."

On July 27 the British Ambassador in Vienna reported his impression, after conversation with all the Ambassadors of the great powers, "that the Austro-Hungarian Note to Servia was so drawn up as to make war inevitable, and that the Austro-Hungarian Government are fully resolved to have war with Servia."

During this time the British Ambassadors in various capitals were discussing with the governments to which they were accredited Sir Edward Grey's proposal for mediation by the four powers. The German Foreign Secretary replied that the suggested meeting of Ambassadors in London would practically amount to a court of arbitration, and could not be called together except at the request of Austria-Hungary and Russia. He could not therefore fall in with the suggestion, however much he might wish to work for the maintenance of peace. On the same day the German Ambassador, nevertheless, informed Sir Edward Grey that the German Government would accept "in principle" mediation by the four powers, "reserv-

ing, of course, the right of Germany to help Austria in case of attack." Sir Edward Grey answered that the Servian reply to the Austrian ultimatum went farther than could have been expected to meet the Austrian demands, that Russia had evidently exercised conciliatory influence at Belgrade, and that "it was really at Vienna that moderating influence was now required."

On the same day, July 27, Sir Edward Grey urged upon Count Mensdorff that the consequences of Austrian action might be incalculable, and pointed out that the British Government "had felt unable" to let the fleet disperse.

On July 28 the Russian Ambassador informed the Foreign Office that if direct explanations between St. Petersburg and Vienna were to prove impossible, Russia would accept the British proposal, or any other proposal of a kind that would bring about a favorable solution of the conflict. A warning had been conveyed to Austria-Hungary on the previous day by the Russian Ambassador in Vienna, that if war should break out with Servia it would be impossible to localize it, "for Russia was not prepared to give way again, as she had done on previous occasions, especially during the annexation crisis of 1909." Nevertheless Austria-Hungary declared war. Germany had temporized and declined to preach moderation at Vienna, while professing readiness to work for the prevention of war between the great powers. The Austro-Hungarian Ambassador in Berlin assured the British Ambassador that "a general war was most unlikely, as Russia neither wanted nor was in a position to make war." "I think," added Sir Edward Goschen significantly, in his report to Sir Edward Grey, that "that opinion is shared by many people" in Berlin.

Acting in this belief, Austria-Hungary declined on July 26 a Russian suggestion that the conflict should be settled directly between the Russian Foreign Minister and the Austro-Hungarian Ambassador at St. Petersburg. Russia then expressed the view that a conference of the less interested powers in London would be the only means of averting an extension of the conflict. Austria-Hungary, however, declined this suggestion on the plea that "events had marched too rapidly." On July 29 Sir Edward Grey took an opportunity to speak his mind to the German Ambassador in London. If Germany became involved in war, and then France, said Sir Edward Grey, the issue might be so great that it would involve all European interests; and he did not wish the friendly tone of the conversation to mislead the Ambassador into thinking that England would stand aside.

Waning Hope.—Hope of preventing a general war was rapidly waning. The German belief that England would or could be induced to remain neutral dominated the situation. Its persistence in spite of Sir Edward Grey's warnings is explained by the proposal addressed to Great Britain by the German Imperial Chancellor through the British Ambassador in Berlin on July 29.

No. 85.

Sir E. Goschen to Sir Edward Grey.—(Received July 29.)

(Telegraphic.) BERLIN, July 29, 1914.

I was asked to call upon the Chancellor to-night. His Excellency had just returned from Potsdam.

He said that should Austria be attacked by Russia, a European conflagration might, he feared, become inevitable, owing to Germany's obligations as Austria's ally, in spite of his continued efforts to maintain peace. He then proceeded to make the following strong bid for British neutrality. He said that it was clear, so far as he was able to judge the main principle which governed British policy, that Great Britain would never stand by and allow France to be crushed in any conflict there might be. That, however, was not the object at which Germany aimed. Provided that neutrality of Great Britain were certain, every assurance would be given to the British Government that the Imperial Government aimed at no territorial acquisitions at the expense of France should they prove victorious in any war that might ensue.

I questioned his Excellency about the French colonies, and he said that he was unable to give a similar undertaking in that respect. As regards Holland, however, his Excellency said that, so long as Germany's adversaries respected the integrity and neutrality of the Netherlands, Germany was ready to give His Majesty's Government an assurance that she would do likewise. It depended upon the action of France what operations Germany might be forced to enter upon in Belgium, but when the war was over, Belgian integrity would be respected if she had not sided against Germany.

His Excellency ended by saying that ever since he had been Chancellor the object of his policy had been, as you were aware, to bring about an understanding with England; he trusted that these assurances might form the basis of that understanding which he so much desired. He had in mind a general neutrality agreement between England and Germany, though it was of course at the present moment too early to discuss details, and an assurance of British neutrality in the conflict which present crisis might possibly produce, would enable him to look forward to realization of his desire.

In reply to his Excellency's enquiry how I thought his request would appeal to you, I said that I did not think it probable that at this stage of events you would care to bind yourself to any course of action and that I was of opinion that you would desire to retain full liberty.

Our conversation upon this subject having come to an end, I communicated the contents of your telegram of to-day to his Excellency, who expressed his best thanks to you.

The German Government had not long to wait for Sir Edward Grey's reply. It was an unconditional rejection, though it still expressed the readiness of His Majesty's Government to continue to work with Germany to preserve the peace of Europe.

No. 101.

Sir Edward Grey to Sir E. Goschen.

(Telegraphic.) FOREIGN OFFICE, July 30, 1914.

Your telegram of 29th July.

His Majesty's Government cannot for a moment entertain the Chancellor's proposal that they should bind themselves to neutrality on such terms.

What he asks us in effect is to engage to stand by while French colonies are taken and France is beaten so long as Germany does not take French territory as distinct from the colonies.

From the material point of view such a proposal is unacceptable, for France, without further territory in Europe being taken from her, could be so crushed as to lose her position as a great power, and become subordinate to German policy.

Altogether, apart from that, it would be a disgrace for us to make this bargain with Germany at the expense of France, a disgrace from which the good name of this country would never recover.

The Chancellor also in effect asks us to bargain away whatever obligation or interest we have as regards the neutrality of Belgium. We could not entertain that bargain either.

Having said so much, it is unnecessary to examine whether the prospect of a future general neutrality agreement between England and Germany offered positive advantages sufficient to compensate us for tying our hands now. We must preserve our full freedom to act as circumstances may seem to us to require in any such unfavorable and regrettable development of the present crisis as the Chancellor contemplates.

You should speak to the Chancellor in the above sense, and add most earnestly that the one way of maintaining the good relations between England and Germany is that they should continue to work together to preserve

the peace of Europe; if we succeed in this object, the mutual relations of Germany and England will, I believe, be *ipso facto* improved and strengthened. For that object His Majesty's Government will work with all sincerity and good-will.

And I will say this: If the peace of Europe can be preserved, and the present crisis safely passed, my own endeavor will be to promote some arrangement to which Germany could be a party, by which she could be assured that no aggressive or hostile policy would be pursued against her or her allies by France, Russia, and ourselves, jointly or separately. I have desired this and worked for it, as far as I could, through the last Balkan crisis, and, Germany having a corresponding object, our relations sensibly improved. The idea has hitherto been too Utopian to form the subject of definite proposals, but if this present crisis, so much more acute than any that Europe has gone through for generations, be safely passed, I am hopeful that the relief and reaction which will follow may make possible some more definite rapprochement between the powers than has been possible hitherto.

The German Imperial Chancellor received this communication "without comment," and remarked only that he would like to reflect upon it before giving an answer. Meanwhile the German Ambassador in London informed Sir Edward Grey that as a result of suggestions by the German Government a conversation had taken place at Vienna between the Austro-Hungarian Foreign Minister and the Russian Ambassador, and that the Austro-Hungarian Ambassador at St. Petersburg had been instructed to converse with the Russian Foreign Minister. In a dispatch to the British Ambassador at St. Petersburg Sir Edward Grey expressed his great satisfaction at the resumption of these discussions, and instructed the Ambassador to tell M. Sazonoff that England earnestly hoped he would encourage them.

An Extreme Proposal.—Following up this dispatch, Sir Edward Grey sent the following telegram to the British Ambassador at Berlin. It showed the extreme lengths to which England was prepared to go for the sake of peace—even to the length of cutting herself loose from Russia and France in case those powers should prove intractable. The telegram ran:

No. 111.

Sir Edward Grey to Sir E. Goschen.

(Telegraphic.) FOREIGN OFFICE, July 31, 1914.

I hope that the conversations which are now proceeding between Austria and Russia may lead to a satisfactory result. The stumbling-block hitherto has been Austrian mistrust of Servian assurances and Russian mistrust of Austrian intentions with regard to the independence and integrity of Servia. It has occurred to me that, in the event of this mistrust preventing a solution being found by Vienna and St. Petersburg, Germany might sound Vienna, and I would undertake to sound St. Petersburg, whether it would be possible for the four disinterested powers to offer to Austria that they would undertake to see that she obtained full satisfaction of her demands on Servia, provided that they did not impair Servian sovereignty and the integrity of Servian territory. As your Excellency is aware, Austria has already declared her willingness to respect them. Russia might be informed by the four powers that they would undertake to prevent Austrian demands going the length of impairing Servian sovereignty and integrity. All powers would of course suspend further military operations or preparations.

You may sound the Secretary of State for Foreign Affairs about this proposal.

I said to German Ambassador this morning that if Germany could get any reasonable proposal put forward which made it clear that Germany and Austria were striving to preserve European peace, and that Russia and

France would be unreasonable if they rejected it, I would support it at St. Petersburg and Paris, and go the length of saying that if Russia and France would not accept it His Majesty's Government would have nothing more to do with the consequences; but, otherwise, I told German Ambassador that if France became involved we should be drawn in.

You can add this when sounding Chancellor or Minister for Foreign Affairs as to proposal above.

The German reply to this appeal is contained in a dispatch from Sir Edward Goschen on July 31. The German Secretary of State declared that it was impossible for the Imperial Government to consider any proposal until they had received an answer from Russia to the German ultimatum. Russia, as was inevitable, rejected the ultimatum, and Germany declared war.

Among the concluding documents of the Blue-book is a telegram on August 4 from Sir Edward Grey to the British Minister at Brussels, instructing him to inform the Belgian Government "that if pressure is applied to them by Germany to induce them to depart from neutrality, His Majesty's Government expect that they will resist by any means in their power, and that His Majesty's Government will support them in offering such resistance, and that His Majesty's Government in this event are prepared to join Russia and France, if desired, in offering to the Belgian Government at once common action for the purpose of resisting use of force by Germany against them, and a guarantee to maintain their independence and integrity in future years."—*London Times.*

Blame on Sir Edward Grey.—Haniel von Haimhausen, Charge d'Affaires of the German Embassy, issued a statement in New York in which he declared that Sir Edward Grey, the British Secretary for Foreign Affairs, sought to impose intolerable conditions upon Germany as the price of British neutrality. He said:

"It is erroneous to assume that the English declaration of war was exclusively caused by Germany's invading Belgium. Negotiations in London had preceded the German attack on Liege.

"During these negotiations Sir Edward Grey promised that England would remain neutral only under the following conditions:

"'First, Germany is not allowed to commit any act of hostility against the French coasts in the North Sea.

"'Second, German troops are not allowed to pass through Belgian territory.

"'Third, the German Navy is not allowed to attack Russia from the Baltic Sea.'

"To the question put up by the German Government whether Great Britain would undertake to respect Belgian neutrality during the whole war no answer was given.

"Sir Edward tried to impose conditions which would have secured to Great Britain, without running any risks, all the benefits which it could have obtained by a successful naval war.

"The acceptance of these conditions would have led to the bottling up of the whole German fleet, forcing it to absolute inactivity.

"Knowing, on the other hand, that a great number of French officers had crossed the Belgian frontier in about 50 motor cars, rushing up to Liege, which was a flagrant violation of Belgian neutrality; knowing further that Antwerp was ready to open its most important harbor to the British fleet and landing corps, Germany was reluctantly compelled to refuse compliance with the British conditions."—*New York Sun.*

Norman Angell's Views.—Norman Angell raised thousands of dollars and set himself for the first time to do political work and organize a neutrality league. He published in various papers a full-paged paid advertisement in large black type, from which I quote certain pregnant passages that some

day may go into the records of the needless war, though now too late to serve in preventing it.

"Why Should We Go to War?

"The war party say we must maintain the balance of power, because if Germany were to annex Holland or Belgium, she would be so powerful as to threaten us; or because we are bound by treaty to fight for the neutrality of Belgium, or because we are bound by our agreements with France to fight for her.

"All These Reasons Are False.
"The War Party Does Not Tell the Truth.

"The facts are these:

"1. If we took sides with Russia and France the balance of power would be upset as it has never been before. It would make the military Russian Empire of 160,000,000 the dominant power of Europe. You know the kind of country Russia is.

"2. We are not bound to join in a general European war to defend the neutrality of Belgium. Our treaties expressly stipulate that our obligations under them shall not compel us to take part in a general European war in order to fulfill them. And if we are to fight for the neutrality of Belgium, we must be prepared to fight France as well as Germany.

"3. The Prime Minister and Sir Edward Grey have both emphatically and solemnly declared in the House of Commons that we have no undertaking whatever, written or spoken, to go to war for France. We discharged our obligations in the Morocco affair.

"4. If Germany did attempt to annex any part of Belgium, Holland or Normandy—and there is no reason to suppose that she would attempt such a thing—she would be weaker than she is now, for she would have to use all her forces for holding her conquests down. She would have so many difficulties like those arising out of Alsace that she would have to leave other nations alone as much as possible. But we do not know in the least that she would do these things. It would be monstrous to drag this country into war on so vague a suspicion."—*L. A. Mead.*

Views of Professors Francke and Münsterberg.—Most spokesmen for Germany reject efforts to distinguish between the rulers and the nation, and reiterate, in a series of letters and statements to the press, their view of the war as one forced on Germany or as a necessary conflict between Slav and Teuton, the latter, of course, standing for civilization. They agree with the Kaiser that the war is "the result of ill-will existing for years against the strength and prosperity of the German Empire." Who are the real aggressors? Asks Professor Kuno Francke. Can William II, who has devoted his whole life to bringing Germany to the front in all the arts of peace, all the higher domains of civilization, "reasonably be supposed to have been carried away by the suicidal mania of destroying everything that his life has stood for?" Can Germany be reasonably thought to have wilfully brought on a conflict which, even if she wins, "can add nothing to her present greatness, and which may wreck her whole national existence?" Finally:

"Is there any reasonable doubt that Germany's three chief competitors, Russia, France, and England, have each her own incentive for an aggressive policy against Germany? England, the incentive of crippling German commerce; France, the incentive of reconquering Alsace-Lorraine; Russia, the incentive of undermining German commercial influence in the Near East and of supplanting Austria in the Balkans."

Similar statements are made by Professor Hugo Münsterberg in a widely quoted letter to the Boston *Herald*.

"This war of Germany is a war of defence. The Slavic attack which was signalized by the Russian mobilization threatened to become crushing, inasmuch as Russia was able to rely on the willingness of France to take revenge. As soon as it was evident that both felt ready to risk the long-delayed blow against Germany it was the duty of the Emperor to save the

country from certain defeat by making the first movement quickly and by declaring war before the slow-moving Russian troops were assembled.

"Now, it is entirely possible that the Emperor was mistaken in believing that Russia really meant war this time and not only bluff. But it is certain that this perhaps mistaken judgment was shared by the overwhelming majority of the nation. In the last few days, as travelers have returned and letters and papers have come in, we know better than a week ago. In every home and wherever two Germans met lived the one conviction: Russia wants war; France is ready, too; if Germany waits some weeks more, its best chance will be lost; the quick declaration of war is unavoidable if the nation is not to be thrown to the ground. The fiction that the true nation wanted peace and the government war is a bold construction which is utterly refuted by the evident facts. The cultured people and the Emperor alike wanted and worked for peace as long as there seemed any hope, but all of them demanded war when they felt convinced that it was the only possible protection against a Slavic onrush.

"This inner unity of people and imperial government in matters of militarism was not confined to this hour of danger after the murder of the Austrian archduke, but it has been the backbone of German politics for the last 40 years. Those men who have achieved the marvelous progress of German civilization have done it in the conviction that the military spirit is a splendid training for cultural efficiency, and that anyhow Germany, in its geographical position between rivals, has no other way open but to prepare for fight. The German university professors whom you praise have always been the most enthusiastic defenders of the system. You hear nowhere in Germany more sneering at the peace and disarmament movements than among the university professors. And are they really disloyal to the Fichte and Kant and the rest? Was the need of Germany's armor ever more passionately proclaimed than in Fichte's 'Orations to the German Nation'? If Germany had been made a republic 20 years ago, and the lawyers and captains of industry, the farmers and the workingmen and, as would be probable, the professors had the say, not one soldier and not one cannon less would stand to-day at the French and Russian border. Yes, it is a fact that repeatedly in the Emperor's reign of 25 years the people would have pushed toward war if the government had not kept a restraining influence. It may be said even of the whole of Europe that the governments have been cooler and more pacific than the peoples.

"The historic state forms have hardly any influence on this war spirit. Has America forgotten how quickly the troops began firing in Vera Cruz and how suddenly a large part of the people wanted to fight until the whole of Mexico was conquered? And yet the 'crime' of Tampico was hardly the assassination of Serajevo. No; the fighting spirit is the same the world over under presidents as under emperors. And if Europe turned republican, the United States of Europe would have to prepare the greater battle with the United States of Asia or all the Americas. But at present it hardly looks as if Europe would go republican. It seems to me that there is more chance that the only great republic will become monarchical. I was in Paris at the Boulanger time. Paris clamors to make the victorious war hero King. Hence those who are overanxious for the area of republicanism may be on the safer side if they pray for the victory of the German Army."

On **August 6** Austria declared war on Russia. The President of the United States, acting under Article Three of The Hague Convention, tendered an offer of mediation to the warring nations.

On **August 7** Montenegro declared war on Austria, and on August 12, war on Germany.

On **August 10** and **12**, respectively, France and Great Britain officially declared war against Austria.

As a result of conversations between the British and French Governments, the British Government has agreed that a state of war between Great Britain and Austria-Hungary will begin as from 12 p. m. last night. (August 13.)

An Admiralty message to begin hostilities has been dispatched.

The following notice was published in supplement to *The London Gazette:*

"Diplomatic relations between France and Austria being broken off, the French Government have requested His Majesty's Government to communicate to the Austro-Hungarian Ambassador in London the following Declaration:

"'Après avoir déclaré la guerre à la Serbie et pris ainsi la première initiative des hostilités en Europe, le Gouvernement austro-hongrois s'est mis, sans aucune provocation du Gouvernement de la République Française, en état de guerre avec la France;

"'1. Après que l'Allemagne avait successivement déclaré la guerre à la Russie et à la France, il est intervenu dans ce conflit en déclarant la guerre à la Russie qui combattait déjà aux côtés de la France.

"'D'après de nombreuses informations dignes de foi, l'Autriche a envoyé des troupes sur la frontière allemande, dans des conditions qui constituent une menace directe à l'égard de la France.

"'En présence de cet ensemble de faits, le Gouvernement français se voit obligé de déclarer au Gouvernement austro-hongrois qu'il va prendre toutes les mesures qui lui permettront de répondre à ces actes et à ces menaces.'

"In communicating this Declaration accordingly to the Austro-Hungarian Ambassador, His Majesty's Government have declared to His Excellency that the rupture with France having been brought about in this way, they feel themselves obliged to announce that a state of war exists between Great Britain and Austria-Hungary as from midnight."

On **August 15** Japan, acting with the advice and consent of Great Britain, sent an ultimatum to Germany demanding the immediate withdrawal of German warships from the Orient and the surrender to Japan of the leased territory of Kiauchau.

THE ANGLO-JAPANESE TREATY.—The treaty under which Japan comes into the affair and makes the conflict truly a world's war follows:

Agreement of Alliance Between the United Kingdom of Japan, Signed at London, July 13, 1911

PREAMBLE

The Government of Great Britain and the Government of Japan, having in view the important changes which have taken place in the situation since the conclusion of the Anglo-Japanese agreement of the twelfth of August, 1905, and believing that a revision of that agreement responding to such changes would contribute to general stability and repose, have agreed upon the following stipulations to replace the agreement above mentioned, such stipulations having the same object as the said agreement, namely:

(a) The consolidation and maintenance of the general peace in the regions of Eastern Asia and India.

(b) The preservation of the common interests of all powers in China by insuring the independence and integrity of the Chinese Empire and the principle of equal opportunities for the commerce and industry of all nations in China.

(c) The maintenance of the territorial rights of the contracting parties in the regions of Eastern Asia and India, and the defence of their special interests in the said regions.

Article 1. It is agreed that whenever, in the opinion of either Great Britain or Japan, any of the rights and interests referred to in the preamble

of this agreement are in jeopardy, the two governments will communicate with one another fully and frankly and will consider in common the measures which should be taken to safeguard those menaced rights or interests.

Article 2. If by reason of unprovoked attack or aggressive action, wherever arising on the part of any power or powers, either high contracting party should be involved in war in defence of its territorial rights or special interests mentioned in the preamble of this agreement, the other high contracting party will at once come to the assistance of its ally, and will conduct the war in common and make peace in mutual agreement with it.

Article 3. The high contracting parties agree that neither of them will, without consulting the other, enter into separate arrangements with another power to the prejudice of the objects described in the preamble of this agreement.

Article 4. Should either high contracting party conclude a treaty of general arbitration with a third power, it is agreed that nothing in this agreement shall entail upon such contracting party an obligation to go to war with the power with whom such treaty of arbitration is in force.

Article 5. The condition under which armed assistance shall be afforded by either power to the other in the circumstances mentioned in the present agreement and the means by which such assistance is to be made available will be arranged by the naval and military authorities of the high contracting parties, who will from time to time consult one another fully and freely upon all questions of mutual interest.

Article 6. The present agreement shall come into effect immediately after the date of its signature, and remain in force for 10 years from that date.

In case neither of the high contracting parties should have notified 12 months before the expiration of the said 10 years, the intention of terminating it, it shall remain binding until the expiration of one year from the day on which either of the high contracting parties shall have denounced it. But if, when the date fixed for its expiration arrives, either ally is actually engaged in war, the alliance shall, *ipso facto*, continue until peace is concluded.

(Signed) E. GREY,
Secretary of State for Foreign Affairs, etc.
TAKAAKI KATO,
Ambassador Extraordinary.

TOKYO, August 16.

The following is the text of the ultimatum:

"We consider it highly important and necessary in the present situation to take measures to remove the causes of all disturbance of the peace in the Far East and to safeguard general interests as contemplated in the agreement of alliance between Japan and Great Britain. In order to secure firm and enduring peace in Eastern Asia the establishment of which is the aim of the said agreement, the Imperial Japanese Government sincerely believe it to be its duty to give advice to the Imperial German Government to carry out the following two propositions:

"(1) To withdraw immediately from Japanese and Chinese waters the German men-of-war and armed vessels of all kinds, and to disarm at once those which cannot be withdrawn.

"(2) To deliver on a date not later than September 15 to the Imperial Japanese authorities, without condition or compensation, the entire leased territory of Kiauchau with a view to the eventual restoration of the same to China.

"The Imperial Japanese Government announces at the same time that, in the event of its not receiving by noon of August 23 an answer from the Imperial German Government signifying unconditional acceptance of the above advice offered by the Imperial Japanese Government, Japan will be compelled to take such action as it may deem necessary to meet the situation."

ABOUT KIAUCHAU.—Kiauchau Bay, oyer which the Japanese have declared war on Germany, is a clamshell-shaped indentation on the south coast of Shantung. From Cape Yatou southward the high, black cliffs of the coast line become more jagged and irregular. A gap occurs in the hills. From the Yellow Sea the tide creeps through a tortuous passage into a land-locked bay extending inward about 50 miles. When the Germans first acquired Kiauchau it was said that they "secured 200 square miles of mud surrounding an equal area of silt laden water too shallow to use."

Established at Kiauchau the Germans labored hard to develop the harbor They dredged and dredged and dredged. They cleaned out the channel so that the largest ships afloat could come into port at Tsingtau. They excavated at an expense exceeding $7,000,000 an outer and an inner harbor. They erected great granite piers, so arranged that ships alongside could receive cargo direct from railway trains. The docks and railway terminals at Tsingtau are models of convenience. Millions were spent to provide special facilities for ocean commerce. Some six miles back from the sea a typical German city was built. The scale on which things were done may be shown by the fact that the casino at Tsingtau cost more than $1,500,000. Included in the improvements undertaken is the extensive afforestation of the erstwhile treeless hills.

From an official point of view at Kiauchau commerce is a secondary consideration. First and foremost the intention is that Tsingtau shall be the Kaiser's stronghold in the Far East. From the beginning the Germans have been fortifying and building more fortifications. Utilizing every natural advantage, the Kaiser's engineers have done their utmost to provide defences for Kiauchau. No outsider knows how many big guns have been placed on the heights commanding the entrance to the bay. It is notable though that 12 forts have been erected for the protection of Tsingtau. The barracks built in 1905 provide quarters for 5000 men. The steel floating dock is capable of accommodating the largest dreadnought. In addition to the regular garrison of artillerymen and marines, some years ago the authorities at Kiauchau maintained two regiments of Chinese infantry recruited from the native population of the leased territory. Officered and trained by Germans, these Chinese made fairly good soldiers. The native reserves of the colony now number about 3000.

Exclusive of Chinese and not counting the crews of the warships in Kiauchau Bay, the Tsingtau garrison, strengthened by the German and the Austrian Legation guards withdrawn from Pekin, is about 8000 men. To this force may be added 1000 reservists, for every able-bodied German civilian in the colony will be called upon to perform military duty.

In Kiauchau the German naval force consists of two armored cruisers, four light cruisers, seven gunboats and two destroyers. In the harbor at Tsingtau also are three Austrian warships, an armored cruiser, a light cruiser and a gunboat. Because of the configuration of the coast and the frequency of fogs blockading Kiauchau is likely to be a perilous, unsatisfactory undertaking.—*Boston Herald.*

On **August 24,** Germany having failed to reply within the time limit of the ultimatum, Japan proceeded to declare war and despatched forces for the blockade and capture of Kiauchau.

The following is the text of the Imperial Rescript declaring war on Germany:

"We, by the Grace of Heaven, Emperor of Japan, on the throne occupied by the same Dynasty from time immemorial, do hereby make the following proclamation to all Our loyal and brave subjects:

"We, hereby, declare war against Germany and We command Our Army and Navy to carry on hostilities against that Empire with all their strength, and We also command all Our competent authorities to make every effort in pursuance of their respective duties to attain the national aim within the limit of the law of nations.

"Since the outbreak of the present war in Europe, the calamitous effect of which We view with grave concern, We, on our part, have entertained hopes of preserving the peace of the Far East by the maintenance of strict neutrality, but the action of Germany has at length compelled Great Britain, Our Ally, to open hostilities against that country, and Germany is at Kiauchau, its leased territory in China, busy with warlike preparations, while her armed vessels, cruising the seas of Eastern Asia, are threatening Our commerce and that of our Ally. The peace of the Far East is thus in jeopardy.

"Accordingly, Our Government, and that of his Britannic Majesty, after a full and frank communication with each other, agreed to take such measures as may be necessary for the protection of the general interests contemplated in the Agreement of Alliance, and We on Our part, being desirous to attain that object by peaceful means, commanded Our Government to offer, with sincerity, an advice to the Imperial German Government. By the last day appointed for the purpose, however, Our Government failed to receive an answer accepting their advice.

"It is with profound regret that We, in spite of Our ardent devotion to the cause of peace, are thus compelled to declare war, especially at this early period of Our reign, and while we are still in mourning for Our lamented Mother.

"It is Our earnest wish that, by the loyalty and valour of Our faithful subjects, peace may soon be restored and the glory of the Empire be enhanced."

Danger to England and China seen in Japan's Action.—The London *Daily News and Leader*, in its issue of August 12, has an article anticipating aggressive action by Japan against Germany and characterizing it as a "danger to England and China."

After saying that the then possible, and now actual, Japanese movement against Kiauchow is looked upon in some quarters as a valuable assistance by Japan to her ally, Great Britain, the newspaper says that it is desirable to look further and ask, first, what right entitles, or what obligation compels, Japan to attack Kiauchow and, second, what are likely to be the consequences for both Great Britain and China if Japan establishes herself in Germany's place. Few powers, it is pointed out, have more reason to desire China's integrity and independence than Great Britain.

The writer points out that up to that time no attack has been made on British territory or shipping in the Far East, and added that if the Germans were wise they would do nothing that would give Japan an excuse to intervene against them "with her overwhelming power, especially since they could in no case do serious injury to British interests in the Far East."

He adds that since it is England who is at war with Germany, it is England who ought to oust Germany from Kiauchow if any foreign power is to do it, and says that "Japan's assistance will be dearly bought, if, under the pretext of aid, which is not necessary, she seizes the important position to which, if Germany loses it and China does not recover it (as she ought), only England is entitled."

The writer concludes:

"From the time of her Chinese war in 1893-4 onward Japan has aimed at increasing her territorial interests in China. As a result of that war she secured Formosa; by defeating the Russians she secured Corea, the Port Arthur peninsula and southern Manchuria, thus threatening Pekin from the north. If now she obtains possession of Kiauchow she will be in a much stronger position to act against Pekin both by land and sea.

"The interest of England is to keep China united, peaceful, undisturbed by foreign encroachments and open to the commerce of all nations on equal terms. We cannot say with any confidence that these are the objects of the policy of the Japanese Government, and it is quite certain that they would not be served by the Japanese occupation of Kiauchow."

(*To be continued.*)

NAVAL DEVELOPMENTS

Naval developments in the following strategic areas will be considered separately and in turn:

1. NORTH AND BALTIC SEAS.
2. MEDITERRANEAN AND BLACK SEAS.
3. THE FAR EAST.
4. THE PACIFIC.
5. THE ATLANTIC.

THE FLEETS OF THE NAVAL POWERS.—In the comparative tables (see page 1562) of the British, friendly and enemy ships of war, only vessels in commission are taken into account, or those which are very near completion, such as in the case of England, the battleships *Emperor of India* (Vickers, Ltd.), *Benbow* (Beardmore & Co.), and the battle cruiser *Tiger* (John Brown & Co.). To the British total is also added the two Turkish battleships, *Sultan Osman I* (Armstrong, Whitworth & Co.) and *Reshadieh* (Vickers, Ltd.), taken over by the British Government and renamed *Agincourt* and *Erin* respectively. It is interesting to note here that the *Agincourt* was originally laid down to the order of Brazil and bore the name *Rio de Janeiro,* but was bought by the Turks while under construction. Two scout destroyers, built for the Chilian Government by Messrs. J. Samuel White & Co., have also been taken over by England and named *Faulkner* and *Broke.* These are also included in the tables to the credit of the British ships. The *Faulkner* and *Broke* are the heaviest destroyers in the world. Australian, New Zealand and Canadian ships are included under British.—*Marine Engineer and Naval Architect.*

ESTIMATE OF AIR NAVIES.—Five thousand military aeroplanes and one hundred and nine military dirigibles, many armored and equipped with aerial guns, bomb-dropping and other death-dealing devices, are distributed among the belligerent nations of Europe, according to the estimate of Henry Woodhouse in an article in *Flying.* The progress of aerial development has been carefully hidden by the different nations, and the only official reports published are of the year 1912. But from reliable official but unpublished reports and knowledge of conditions and aeronautical plans of the nations, this writer believes the strength of the nations in aircraft may be estimated as follows:

France: Aeroplanes, 1200 military, 500 added since by acquisition of private machines and output of factories. Dirigibles, 12 of close to 400 feet in length; 14 of less than 300 feet in length; five privately owned, or 31 altogether.

Germany: Aeroplanes, 600 military, 400 added since by acquisition and output of factories. Dirigibles, 12 *Zeppelins* of from 350 to 490 feet long; 23 dirigibles of other types, including those privately owned.

Russia: Aeroplanes, 800 military, 150 added since. Dirigibles, 16 of different types, but mostly under 250 feet in length.

England: 200 seaplanes; 300 army aeroplanes; 300 added since. Dirigibles, 15, mostly new, up-to-date machines acquired in the past twelve months.

Class	Great Britain			France			Russia		
	Ships	Disp. Tons	Guns	Ships	Disp. Tons	Guns	Ships	Disp. Tons	Guns
Battleships—Modern	26	556,850	228 12″ to 13.5″	4	204,988	232 5.5″ to 12″	2 (other s build'g) (4 bu ilding)	34,800	60 4.7″ to 12″
Battle Cruisers	10	215,800	80 12″ to 13.5″	....	....	....			....
Later Battleships	38	556,200	628 6″ to 12″	15	187,290	239 4″ to 12″	6	77,974	....
Cruisers—First Class	37	439,800	520 6″ to 9.2″	19	197,121	290 4″ to 7.6″	6	64,220	114 4.7″ to 10″
Light Cruisers	71	342,705	654 4.7″ to 6″	11	49,541	†96 4″ to 9.4″	16	99,927	....
Destroyers	227	....	....	80	....	....	80	....	....
Torpedo Boats	102	....	....	*153	....	....	18	....	....
Submarines	78	....	....	67	....	....	25	....	....
	589	2,111,355	2,110	349	638,940	857	157	276,921	174

Class	Germany			Austria-Hungary			Italy			Japan		
	Ships	Disp. Tons	Guns	Ships	Disp. Tons	Guns	Ships	Disp. Tons	Guns	Ships	Disp. Tons	Guns
Battleships—Modern	16	308,600	344 6″ to 12″	2	40,000	48 6″ to 12″	4	84,400	125 4.7″ to 12″	7	128,376	162 6″ to 12″
Battle Cruisers	4	95,400	82 6″ to 12″	...	....	....	...	....	....	1	27,500	24 6″ to 14″
Later Battleships	24	271,690	414 4″ to 11″	9	98,601	189 4.1″ to 12″	8	95,418	136 4.7″ to 12″	7	97,600	112 6″ to 12″
Cruisers—First Class	9	94,135	132 6″ to 9.4″	2	13,725	21 6″ to 9.4″	9	74,250	135 4.7″ to 10″	11	118,906	222 6″ to 12″
Light Cruisers	41	150,062	416 †4.1″ to 9.4″	7	23,870	57 4.1″ to 7.6″	11	38,148	88 ‡4.7″ to 10″	11	54,415	104 4.7″ to 8″
Destroyers	152	....	....	18	....	....	36	....	....	54	....	....
Torpedo Boats	45	....	....	87	....	....	85	....	....	55	....	....
Submarines	30	....	....	11	....	....	20	....	....	15	....	....
	321	919,887	1,388	136	176,196	315	173	292,216	484	161	426,797	624

* Not all effective. † 9.4″ guns on one ship only. ‡ 10″ guns on one ship only.
German vessels, *Goeben* and *Breslau*, and the English, *Amphion* (sunk), not included.

Austria: Aeroplanes, 350, of which all but 100 have been acquired since the beginning of hostilities. Dirigibles, 10, mostly under 300 feet in length.
Belgium: Aeroplanes, 40, and 40 acquired since the beginning of hostilities. Dirigibles, two, one medium size, and one small.
Servia: Aeroplanes, 40; dirigibles, none.

ORGANIZATION OF BRITISH FLEET

HOME WATERS

A. First Fleet (except 4th Cruiser Squadron).
- (1) First Battle Squadron.
  - 8 dreadnoughts.
    - 1 carries 10 13.5-in. guns.
    - 7 carry 10 12-in. guns.
- (2) Second Battle Squadron.
  - 8 dreadnoughts.
    - All carry 13.5-in. guns.
- (3) Third Battle Squadron.
  - 8 pre-dreadnoughts.
    - *King Edward* type, carrying 4 12-in guns.
- (4) Fourth Battle Squadron.
  - 3 dreadnoughts.
    - Carrying 12-in. guns.
  - 1 pre-dreadnought.
- (5) First Battle Cruiser Squadron.
  - 4 battle cruisers.
- (6) Second Cruiser Squadron.
  - 4 armored cruisers.
- (7) Third Cruiser Squadron.
  - 4 armored cruisers.
- (8) First Light Cruiser Squadron.
  - 4 light cruisers.

B. Second Fleet.
- (1) Fifth Battle Squadron.
  - (Composed of pre-dreadnoughts, *Bulwark* type.)
- (2) Sixth Battle Squadron.
  - (Composed of pre-dreadnoughts, *Duncan* type.)
- (3) Fifth Cruiser Squadron.
  - (Composed of *County* class.)
- (4) Sixth Cruiser Squadron.
  - (Composed of *Drake* class.)

C. Third Fleet.
- (1) Seventh Battle Squadron.
  - (Composed of pre-dreadnoughts, *Majestic* type).
- (2) Eighth Battle Squadron.
- (3) Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth Cruiser Squadrons.
  - (Composed of cruisers of all sorts.)

D. Mediterranean Fleet.
- (1) Second Battle Cruiser Squadron.
  - 3 battle cruisers.
- (2) First Cruiser Squadron.
  - 4 armored cruisers.
- (3) Second Light Cruiser Squadron.
  - 4 light cruisers.

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ORGANIZATION OF GERMAN FLEET

GERMAN HIGH SEA FLEET

PERMANENTLY IN FULL COMMISSION

Fleet Flagship: *Friedrich der Grosse* (Dreadnought)

First Squadron (Eight Dreadnoughts) (Wilhelmshaven)	Second Squadron (Eight Pre-Dreadnoughts) (Kiel)	Third Squadron (Four Dreadnoughts) (Kiel)
Ostfriesland.	*Preussen.*	*Kaiser.*
Thuringen.	*Schleswig-Holstein.*	*Kaiserin.*
Helgoland.	*Pommern.*	*König Albert.*
Oldenburg.	*Hannover.*	*Prinzregent Luitpold.*
Nassau.	*Hessen.*	
Rheinland.	*Schlesien.*	
Posen.	*Lothringen.*	
Westfalen.	*Deutschland.*	

Total.—21 battleships, including 13 dreadnoughts.

CRUISER SQUADRON

(Wilhelmshaven)

Four Battle Cruisers	Eight Light Cruisers
Seydlitz.	Eight vessels, *Rostock, Magdeburg,* and *Kolberg* types.
**Goeben.*	
Von der Tann.	
Moltke.	

Total.—12 cruisers, including four dreadnoughts.

DESTROYER FLOTILLAS

Seven flotillas each of 11 destroyers, fully manned.

First.—555 tons, 32½ knots.
Second.—555 tons, 32½ knots.
Third.—640 tons, 32½ knots.
Fourth.—640 tons, 32½ knots.
Fifth.—616 tons, 30 knots.
Sixth.—670 tons, 30 knots.
Seventh.—530 tons, 30 knots.

Total.—77 vessels, with seven (one for each flotilla) in reserve.

SUBMARINE FLOTILLAS

Three flotillas each of seven submarines, fully manned.

First.—800 tons; three tubes; 17 knots.
Second.—295 tons; two tubes; 12 knots.
Third.—240 tons; two tubes; 12 knots.

Total.—21 vessels, or three-fourths of completed submarines.

RESERVE FLEET

(ONE QUARTER PERMANENTLY IN FULL COMMISSION)

Fourth Squadron	Fifth Squadron
†*Elsass.*	*Wettin.*
†*Braunschweig.*	*Kaiser Barbarossa.*
†*Wittelsbach.*	*Kaiser Karl der Grosse.*
†*Zähringen.*	*Kaiser Wilhelm der Grosse.*
‡*Schwaben.*	*Kaiser Wilhelm II.*
Mecklenburg.	*Kaiser Friedrich III.*

Total.—Twelve pre-dreadnought battleships.

Two other battleships (1891) and eight small coast defence battleships are still on the list.

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* Mediterranean.
† In full commission. ‡ Gunnery and torpedo training ships.

CRUISER SQUADRON

Six Armored Cruisers	About 16 Light Cruisers
‡*Blucher.*	*Konigsberg, Hamburg,* and smaller types.
Yorck.	
Roon.	
‡*Friedrich Carl.*	
‡*Prinz Adalbert.*	
‡*Prinz Heinrich.*	

TORPEDO FLOTILLA

About 48 destroyers and 48 torpedo boats.

TRAINING SQUADRON

Light cruisers *Freya, Hansa, Hertha* and *Victoria Luise.*

ORDNANCE

The heaviest caliber of gun mounted in the German Navy at present is the 12-in., which is carried only in nine battleships, the fleet flagship, the first four ships of the first squadron, and the four of the third squadron. For the rest of the fully-commissioned battleships and battle cruisers the 11-in. gun is the main piece, but the oldest battleships in the reserve have only the 9.4-in. gun.

NORTH AND BALTIC SEAS

BRITISH SHIPS IN HOME WATERS

13 super-dreadnought battleships. (3 were due for completion this year and are probably now in commission.)	22 light cruisers.
	44 protected cruisers.
	198 destroyers.
	89 torpedo-boats.
11 dreadnought battleships.	72 submarines.
7 dreadnought battle cruisers.	7 mine layers.
38 pre-dreadnought battleships.	3 repair ships.
30 armored cruisers.	

GERMAN SHIPS IN HOME WATERS

16 dreadnoughts.	33 light cruisers.
4 battle cruisers.	151 destroyers.
24 pre-dreadnoughts.	47 torpedo-boats.
9 armored cruisers.	38 submarines.

The following ships are sufficiently advanced to be made ready for service at short notice: Battleships *König, Grosser Kurfürst,* and *Markgraf;* battle cruiser *Derfflinger.*

In torpedo craft, both destroyers and submarines, Germany will probably be able to strengthen her fleet materially and rapidly. There were in hand at least a score of destroyers and the same number of submarines when war broke out, a large number of which may have since been completed. If it has been determined to concentrate the energies of the German yards upon torpedo-craft construction, as may well be the case, the output monthly may be considerable. There are four yards in Germany which have been practised in the building of torpedo vessels, and before the war the period of construction at these yards was on an average from 10 to 18 months. As they built for foreign governments as well, their full capacity is probably three or four times the 12 destroyers and six submarines provided for annually under the German Navy Law. Yards which have not

‡ Gunnery and torpedo training ships.

been mainly employed in torpedo-craft construction can in an emergency undertake such work, and no doubt if it is considered desirable at least 12 yards in Germany may at the present time be engaged in this branch of naval construction.

RUSSIAN SHIPS IN BALTIC WATERS

4 pre-dreadnought battleships.	80 destroyers.
14 armored and protected cruisers.	24 submarines.
2 light cruisers.	

RUSSO-GERMAN BALTIC MOVEMENTS.—German ships have been engaged in firing practice almost daily off Memel and Libau, and it is thought that the vessels concerned are those of the Reserve Squadron, based upon Danzig and Königsberg. The *Daily Mail* correspondent at Copenhagen, on August 6, gave the strength of this force at 20 vessels, which he said were off Gothland, between Sweden and Russia. Four German destroyers were also reported off Hammerfest, apparently bound for the White Sea. Reuter's correspondent at Copenhagen stated that on the afternoon of August 5 three German submarines were sighted at the southern outlet of the sound. They appear to have taken up their position there as a sort of advance guard. Meanwhile, the Russian fleet in the Baltic is practically secure from attack in its strong position behind the fortifications of Sveaborg, in the Gulf of Finland. It is stated to have repulsed a renewed attack by vessels of the German squadrons in the Baltic, but of this there is no confirmation at present, nor of the report that a Russian torpedo-boat has sunk the German light cruiser *Augsburg*, which bombarded Libau on August 2.

DESTRUCTION OF LIGHT CRUISER "MAGDEBURG."—The German official account stated that on August 27 the light cruiser *Magdeburg* ran ashore in a fog on the Island of Odensholm, at the entrance of the Gulf of Finland. Owing to the thick weather the other German warships in the vicinity were unable to render assistance. All efforts to refloat the vessel having failed, the captain decided to sacrifice her, as a superior Russian naval force was preparing to attack. Under heavy fire from the Russian fleet the majority of the cruiser's crew was saved by torpedo-boat *V 26*. Seventeen men were killed and 21 wounded. Eighty-five are missing, including the captain. The *Magdeburg* was blown up.

SUBMARINE MINES LAID.—The Board of Trade has issued the following notices:

"With regard to the navigation of the Sound, Copenhagen, submarine mines are laid at the entrances of the Konge Deep, the Hollander Deep, and the Drogden Channel. The passage is temporarily limited to the Flint Channel. A pilot is compulsory at Copenhagen.

"Mines have been laid at the following places on the German coast: (1) Round Heligoland; (2) Cuxhaven; (3) at the mouths of Weser, Jahde, and Elbe, and at Borkum; and lightships on German North Sea coast have been brought into port.

"Preparations have been made to close the main entrance to the harbor at Algiers, and the Agha entrance has already been closed. Foreign ships have been advised to leave Algiers harbor immediately, otherwise they might be delayed indefinitely."

NORTH SEA

GERMAN MINELAYER SUNK.—From such information as has been published in regard to the sinking of the German minelayer *Königin Luise*, the operation seems to have been smartly executed by the third destroyer flotilla. The minelayer was a passenger vessel of the Hamburg-Amerika Line, of 2163 gross tonnage and a speed of twenty knots, specially fitted

for minelaying. She had probably laid a line of mines from Aldeburgh Ridge to lat. 52.10 deg. north, long. 2.25 deg. east. On her being sighted some sixty miles off the Suffolk coast, the light cruiser *Amphion,* Capt. C. H. Fox, and the destroyers of the *L* class in the third flotilla gave chase. One account mentions that the minelayer was chased for some thirty miles before being overtaken. It was at noon on Wednesday, August 5, when she was sunk, about forty miles from Antwerp. Very few shots sufficed to send her to the bottom, and the marksmanship was most accurate. From one destroyer four shots were fired, of which the first blew the bridge away, the second struck home in the bows, and another tore off the propeller. The destroyer *Lance,* which was only delivered to the navy by Thornycroft's on the Saturday previously, was instrumental in completing the destruction of the minelayer, while the *Lark* and *Linnet* are said to have opened the firing. The German fire is described as having been quite ineffective. In any case, there were no British casualties on account of the action. On the night of August 5, destroyers brought to Harwich 28 wounded German seamen, four of whom died and were buried at Shotley Churchyard.

"AMPHION" SUNK.—The following official account of the sinking of H. M. S. *Amphion* was issued by the Government Press Bureau.

At 9 a. m., on August 5, H. M. S. *Amphion* with the third flotilla proceeded to carry out a certain prearranged plan of search, and about an hour later a trawler informed them that she had seen a suspicious ship "throwing things overboard" in an indicated position.

Shortly afterwards the minelayer *Köningen Luise* was sighted steering east. Four destroyers gave chase, and in about an hour's time she was rounded up and sunk.

After picking up the survivors the prearranged plan of search was carried out without incident until 3.30 a. m., when as the *Amphion* was on the return course nearing the scene of the *Köningen Luise's* operations, the course was altered so as to avoid the danger zone. This was successfully done until 6.30 a. m., when the *Amphion* struck a mine.

A sheet of flame instantly enveloped the bridge, rendered the captain insensible, and he fell onto the fore and aft bridge. As soon as he recovered consciousness he ran to the engine-room to stop the engines, which were still going at revolutions for 20 knots. As all the fore part was on fire, it proved impossible to reach the bridge or to flood the fore magazine. The ship's back appeared to be broken, and she was already settling down by the bows. All efforts were therefore directed towards placing the wounded in a place of safety in case of explosion, and towards getting her in tow by the stern.

By the time the destroyers closed it was clearly time to abandon the ship. The men fell in for this purpose with the same composure that had marked their behavior throughout. All was done without hurry or confusion, and twenty minutes after the mine was struck the men, officers, and captain left the ship.

Three minutes after the captain left his ship another explosion occurred, which enveloped and blew up the whole fore part of the vessel. The effects showed that she must have struck a second mine, which exploded the fore magazine. Debris falling from a great height struck the rescue boats and destroyers, and one of the *Amphion's* shells burst on the deck of one of the latter, killing two men and a German prisoner rescued from the cruiser.

The after part now began to settle quickly until its foremost part was on the bottom and the whole after part tilted up at an angle of 45 degrees. In another quarter of an hour this, too, had disappeared.

Captain Fox speaks in high terms of the behavior of the officers and men throughout. Every order was promptly obeyed without confusion or perturbation.

GERMAN SUBMARINE SUNK.—It was officially announced August 10 that one of the cruiser squadrons of the main British fleet had been attacked on the previous day by submarines. None of the cruisers were damaged, but one of the enemy's submarines, *U 15*, was sunk. From a subsequent announcement it became known that it was the first light cruiser squadron, Commodore W. E. Goodenough, which was involved, as the vessel which sunk the submarine was the light cruiser *Birmingham*, Captain A. A. M. Duff. The lost vessel was not of the latest 800-ton type, which began with *U 21*, but she was of about 300 tons displacement, with a crew of about 12 officers and men, and was therefore similar to the *C* class in the British Navy. It was not stated whether she was sunk by gun fire or by being rammed by the *Birmingham*. In either case she must have approached pretty close to the ship, but it was significant that she inflicted no damage from any one of her three torpedo tubes. She was built at Danzig in 1912, and had heavy oil engines of the Diesel type of 450 horse-power for surface propulsion, and electric motors of 150 horse-power for submerged running. Her speed on the surface was about 13 knots, and below, 8½ knots. This was the first recorded encounter between a large ship and a modern submarine in actual warfare.

The *Scotsman* prints the following account from a correspondent of the action which resulted in the loss to the Germans of submarine *U 15*.

It is a story of fine seamanship and brilliant gunnery. It is known generally that a cruiser squadron of the British fleet was attacked by a German submarine flotilla, and that the squadron sustained no loss, whilst destroying one of the enemy.

The Submarine Attack.—As stated, the action occurred on Sunday. On that day the cruiser squadron, occupying its allotted place in the present naval dispositions, became aware of the approach of a submarine flotilla. The enemy approached submerged, only the periscopes showing above the surface of the water. The exact number of the attacking flotilla was noted, but need not be stated. The attitude of the squadron in face of the approach of "the deadliest of the things that keep the sea" was coolly deceptive. There seems no doubt that the Germans were utterly misled. The tactics followed will not be described, though they were, of course, seen by the enemy's flotilla.

Then came a change. The nearest submarine was showing her periscope at a distance just within the danger zone, when the cruiser *Birmingham*, steaming at full speed, fired the first shot. The shot was not meant for the sunken body of the submarine beneath its deep cushion of the protecting waves. It was aimed at the thin line of the periscope, which ripped the surface, and the gunnery was splendid, shattering the periscope.

Sightless Vessel.—The periscope was shattered, and the submarine, now a blinded thing, rushing under water in immediate danger of self-destruction from collision with one of the cruisers ploughing above, was in a serious plight. Her consorts recognized their danger and made off, but the sightless submarine, in the circumstances in which the action was being fought, was bound to come up to the surface.

The cruiser had not long to wait for her reappearance. As the dark mass of the conning-tower of the enemy showed on the surface the guns of the *Birmingham* covered it, and in a moment the second shot of the fight was fired.

There was just time for the observers to see the distinguishing number and letter of the doomed vessel ere a shot, striking the base of the conning-tower just where it was awash, ripped the whole upper structure clean out of the submarine, and she sank like a stone, instantaneously.

THE HELIGOLAND ENGAGEMENT.—The Press Bureau issued the following account of the engagement in the North Sea:

In the action of August 28, off Heligoland, the light armored cruiser *Arethusa*, and not the *Amethyst*, as previously stated, played the principal part. This vessel, which is the first of the 20 built under the

present Board of Admiralty, carried the broad pennant of Commodore Tyrwhitt, commanding the flotillas of the first fleet.

The principle of the operation was a scooping movement by a strong force of destroyers headed by the *Arethusa* to cut the German light craft from home and engage them at leisure in the open sea. The *Arethusa,* leading the line of destroyers, was first attacked by two German cruisers and was sharply engaged for 35 minutes at a range of about 3000 yards, with the result that she sustained some damage and casualties, but drove off the two German cruisers, one of which she seriously injured with her 6-inch guns.

Later in the morning she engaged at intervals two other German vessels, which were encountered in the confused fighting which followed, and, in company with the *Fearless* and the light cruiser squadron, contributed to the sinking of the cruiser *Mainz.*

The Arethusa's Qualities.—In these encounters the *Arethusa's* speed was reduced to 10 knots, and many of her guns were disabled, and at 1 o'clock she was about to be attacked by two other cruisers of the German *Town* class when the battle cruiser squadron most opportunely arrived and pursued and sank these new antagonists. The armored protection, speed, and fighting qualities of the *Arethusa* class have now been vindicated, and this is satisfactory in view of the fact that a large number of these valuable and unique vessels will join the fleet in the next few months.

It must be remembered that the *Arethusa* had only been commissioned a few days before as an emergency ship and that the officers and crew were new to each other and to her. In these circumstances the series of actions which they fought during the morning is extremely creditable and adds another page to the annals of a famous ship.

Although only two of the enemy's destroyers were actually observed to sink, most of the 18 or 20 boats rounded up and attacked were well punished and only saved themselves by scattered flight. The superior gunpower and strength of the British destroyers ship for ship was conclusively demonstrated. The destroyers themselves did not hesitate to engage the enemy's cruisers both with guns and torpedoes with hardihood, and two of them—the *Laurel* and *Liberty*—got knocked about in the process.

Intercepted German signals and other information from German sources confirm the report of Rear Admiral Beatty as to the sinking of the third German cruiser, which now appears to have been the *Ariadne.* The British destroyers exposed themselves to considerable risk in endeavoring to save as many as possible of the drowning German sailors.

The destroyer *Defender* was actually picking up wounded with her boats when she was driven off by the approach of another German cruiser and had to leave two of her boats, containing one officer and nine men, behind. It was feared that these had been made prisoners, but happily submarine *E 4* arrived and brought the British party home. As it was not possible to accommodate the 30 Germans in the submarine, they were allowed to return to Germany in the boat under the charge of an ober lieutenant, who was wounded.

The German Loss.—The complements of the five German vessels known to have been sunk aggregated about 1200 officers and men, all of whom, with the exception of these 30 and about 300 wounded and unwounded prisoners, perished. Besides this there is the loss, which must have been severe, on board the German torpedo-boats and other cruisers which did not sink during the action.

The total British casualties amounted to 69 killed and wounded, among whom must, however, be included killed two officers of exceptional merit—Lieutenant Commander Nigel K. W. Bartellot and Lieutenant Eric W. P. Westmacott. All the British ships will be fit for service in a week or ten days.

The success of this operation was due in the first instance to the information brought to the Admiralty by the submarine officers, who have during the past three weeks showed extraordinary daring and enterprise in penetrating the enemy's waters.—*Admiralty.*

GERMAN ADMISSION OF DEFEAT

COPENHAGEN, August 29.

A semi-official telegram from Berlin says:

Yesterday morning in rather foggy weather several small British cruisers and two flotillas of torpedo-boats, nearly 40 in number, appeared in a German bay of the North Sea to the northwest of Heligoland. Desperate isolated fights occurred between them and our light forces.

The small German cruisers went in a westerly direction and, in consequence of the short distance, came into contact with several strong cruisers. Thus the German cruiser *Ariadne* was hit by shots from two large cruisers of the *Lion* class, and sank after a glorious fight. Most of the crew of 250 men were saved.

The torpedo-boat *V 187* was bombarded by a small cruiser and 10 torpedo-boats, and sank after continuing to fire until the last moment, and the commander of the squadron was killed.

The small cruisers *Koln* and *Mainz* are missing, and, according to telegrams from England, they were sunk after a fight with a superior force of the enemy. Of their crews eight officers and 91 men appear to have been saved by the British ships.—*Reuter.*

A German wireless message received by the Marconi Company, dated Berlin, August 30, says:

The naval engagement near Heligoland is treated by the press as without significance and as one which cannot affect the general situation. Fighting took place apparently within range of the Heligoland forts, which were unable to use their guns owing to the thick weather.

Account of the Action.—The *Liberty* had the misfortune to be hit by a shell which shattered her mast, tore away part of her bridge first of all, and then smashed her searchlight, and killed her gallant captain, Lieutenant Commander Nigel K. W. Bartellot, and William Butcher, his signaller, who was standing by him on the bridge. Death was instantaneous.

German shot did some damage to the engine room of the *Arethusa.* A shell exploded on the superstructure of the *Arethusa,* killing several on duty there. Lieutenant Westmacott was killed outright, a portion of the shell piercing his heart.

The *Laertes* was hit; her midship funnel was holed; her forward gun was damaged, and she had a shell in her dynamo room, and a shot aft which wrecked the vessel's cabin.

DESULTORY FIGHTING.—*Conditions Existing on August 21.*—On August 19 the Press Bureau issued the following statement: "Some desultory fighting has taken place during the day between the British patrolling squadron and flotillas and German reconnoitering cruisers. No losses are reported or claimed. A certain liveliness is apparent in the southern area of the North Sea." A reassuring statement was made by the *Daily Chronicle's* correspondent in Hull to the effect that the mine-sweeping fleet of trawlers had almost cleared the areas of the North Sea that were strewn with mines by the Germans. Meanwhile, trading and passenger steamers have been resuming their regular sailings. Cargoes of foodstuffs have been arriving at several east coast ports both in England and Scotland. As the *Times* naval correspondent remarks, "British fishing boats are putting out, coastwise traffic has been resumed, mail and passenger boats are running to and fro between Britain and Northern Europe, and a Norwegian bark, the *Ingrid,* is said to have arrived at Dover on August 13 from the Baltic, having crossed the waterway without seeing any signs of war."

OFFICIAL WARNING.—The following statement was issued by the Press Bureau on August 23:

The Admiralty wish to draw attention to their previous warnings to neutrals of the danger of traversing the North Sea. The Germans are continuing their practice of laying mines indiscriminately upon the ordinary trade routes. These mines are not laid in connection with any definite military scheme, such as the closing of a military port, or as a distinct operation against a fighting fleet, but appear to be scattered on the chance of catching individual British war or merchant vessels. In consequence of this policy neutral ships, no matter what their destination, are exposed to the gravest dangers. Two Danish vessels, the steamship *Maryland* and the steamship *Broberg*, have, within the last twenty-four hours, been destroyed by these deadly engines in the North Sea while traveling on the ordinary routes at a considerable distance from the British coast. In addition to this, it is reported that two Dutch steamers, clearing from Swedish ports, were yesterday blown up by mines in the Baltic. In these circumstances the Admiralty desire to impress not only upon British but on neutral shipping the vital importance of touching at British ports before entering the North Sea in order to ascertain, according to the latest information, the routes and channels which the Admiralty are keeping swept, and along which those dangers to neutrals are reduced so far as possible.

WASHINGTON, August 30.—The British Embassy has received the following from the Foreign Office in London and has communicated a copy of it to the State Department:

"His Majesty's Government has learned that on or about August 26 an Iceland trawler is reported to have struck a mine 25 miles off the Tyne and sunk, and at least one foreign newspaper has stated that the mine was English. Although the German action in laying mines has forced the Admiralty to reserve to itself the right to do likewise, the statement already made by His Majesty's Government that no British mines have been laid remains absolutely true at this moment.

"The mines off the Tyne were laid thirty miles to seaward, not as a part of any definite military operation, nor by German ships of war but by German trawlers, of which a considerable number appear to have been engaged on this work; one having actually been seen doing this was *A. E. 24 Emden*. It would be well if the conduct of those who ordered her to perform this act were carefully considered by neutral powers."

DANGER OF MINES.—The mines appear to be laid by all sorts of craft, such as pleasure steamers and fishing smacks, and the work is done principally at night. On August 27 the Press Bureau issued the following statement:

"Last (Wednesday) night the *Skealli Sogeti*, a small Danish ship, was blown up by a German mine on the trade route to Newcastle about thirty miles off the coast. Yesterday, at the same place, the Norwegian ship the *Gottfried*, the *Ena*, of Svendvord, and two British trawlers were also destroyed. The total loss of life amongst the neutral cannot yet be fully estimated, but in the two British trawlers five men were killed and eleven injured. The crew of the *Ena* were saved by a British torpedo-boat."

On or about August 26, says the bureau, an Iceland trawler is reported to have struck a mine 25 miles off the Tyne and sunk.

MINES SINK TWO VESSELS.—Thirteen survivors of a Danish trawler which was sunk by striking a floating mine in the North Sea, have been landed at Shields. Four of the crew of the trawler lost their lives. The fisherman was on her way to Iceland when, at 10 o'clock on the night of August 19, those on board felt a terrific explosion. Flames shot up around the bow of the vessel and she began to sink rapidly. A small boat was launched, but the vessel foundered before four men in the forecastle could be reached.

Describing his experiences, the chief officer, who was on watch, said the concussion hurled him against the wheelhouse with great violence. He was successful in getting two injured men out of the forecastle, but four others must have been killed as they slept.

The captain of the trawler and three others were picked up from floating wreckage and brought into Shields by the fishing boat *Norden*. Officers of the latter say they were alarmed all through the night by distant explosions which followed each other at intervals from 9 p. m., to 4 a. m. At about 6 o'clock in the morning the lookout on the *Norden* sighted a man floating on a plank. He was picked up, and declared that the *Gottfried* had been blown up three hours earlier and had gone down immediately, with eight members of her crew. The dead men had been literally blown to pieces. Later the captain of the *Gottfried* was found floating in a lifebelt, and two others of her complement were rescued from floating wreckage.

The Norwegian steamer *Gottfried* was built at Stockholm in 1899, had a gross tonnage of 425 and was 140 feet long. She was owned in Haugesund, Norway.—*Boston Transcript.*

MINE SINKS TRAWLER.—A German trawler, supposed to have been acting as a guard ship, has been sunk by a mine in the open sea southeast of Langeland.

A Danish schooner rescued ten men from the trawler, all of them injured by the explosion.

MEDITERRANEAN AND BLACK SEAS

The naval powers are represented in the Mediterranean as follows:

FRANCE

4 dreadnoughts.
18 pre-dreadnoughts.
(All carry 12-inch guns.)
20 armored and protected cruisers.
11 light cruisers.
(Several of these were abroad at the opening of the war.)
84 destroyers.
153 torpedo-boats.
(Most of these are small and probably suitable only for harbor defence work.)
70 submarines.

GREAT BRITAIN

3 battle cruisers.
4 armored cruisers.
16 destroyers and depot ships.
2 gunboats.
6 submarines.
(3 at Malta; 3 at Gibraltar.)
16 torpedo-boats.

AUSTRIA-HUNGARY

3 dreadnoughts.
(Only the dreadnoughts and 3 of the pre-dreadnoughts are armed with 12-inch guns. The others carry 9.4-inch weapons.)
12 pre-dreadnoughts.
2 armored cruisers.
12 light cruisers.
(Including 3 nearing completion at the outbreak of the war.)
19 destroyers.
11 submarines.
58 torpedo-boats.
(These torpedo-boats are only 200 tons or smaller; armed for the most part with 3-pounders.)

GERMANY

1 battle cruiser (*Goeben* *).
1 light cruiser (*Breslau* *).

* Sold to Greece.

RUSSIA

6 pre-dreadnoughts.	16 torpedo-boats.
2 large cruisers.	5 submarines.
16 destroyers.	

CHASE OF THE "GOEBEN."—The exploits of the battle cruiser *Goeben* and light cruiser *Breslau* provided some interesting items of naval news. Thanks to their slightly superior speed they were able to elude their pursuers on more than one occasion, and to constitute some menace to Mediterranean trade. After bombarding the Algerian coast, on the morning of August 4, the two cruisers proceeded toMessina, where their officers are alleged to have stated to a newspaper correspondent that the *Goeben* bombarded Philippeville and almost entirely destroyed it in an hour, while the *Breslau* sank some ships in Bona Harbor and bombarded the town. They were sighted by British ships, but turned east and took refuge in Messina, arriving on August 5. This being a neutral port, they were obliged to leave within 24 hours or be disarmed. They obtained what fuel they could from passing German steamers and from a local German firm, and left on Thursday evening, August 6, heading south. It was said that the admiral landed and entrusted his will and personal effects to friends, while his officers gave theirs to the German Consul, and as the ships left harbor the crews dressed ship and the bands played the German national anthem. The cruisers, however, succeeded in eluding the British ships watching for them in the Straits. Taking advantage, no doubt, of the dusk of evening, the Germans got away, and nothing more of a definite character was heard about them until, on August 11, they were reported to have taken refuge in the neutral Dardanelles. Apparently as an alternative to disarming, these ships were sold by Germany to Turkey. This transaction was without precedent and involved a question of international law.

Great Britain, France, and Russia sent a sharp demand to Turkey for the immediate repatriation of the officers and crews of the *Goeben* and *Breslau*. It is reported that Russia, claiming that Turkey had violated her neutrality, has made representations to the effect that unrestricted passage through the Dardanelles be granted to the Russian Black Sea fleet.

THE "GOEBEN" AND "BRESLAU."—According to the latest information the *Goeben* and *Breslau* arrived at Constantinople August 18, eight days after they first entered the Dardanelles. The *Times* correspondent at Constantinople states that they have received Ottoman officers and crews. The *Goeben* was reported by a Reuter telegram from Mitylene to have been seen in the Sea of Marmora on August 13, flying the German flag, and other reports show that the cruisers were not idle before their German crews left them. On August 11, the morning after they arrived in the Dardanelles, the German officers are stated by Reuter to have boarded several ships, including one English vessel, and to have given them peremptory orders not to move. They also went on board the French liner *Saghalien*, which has since arrived at Marseilles, and with a detachment of armed seamen smashed her wireless apparatus, carrying away the instruments. The vessel had 600 reservists on board. The Paris correspondent of Reuter's Agency telegraphed on August 17 that a message from Constantinople had been received expressing the regret of the Turkish Government at the treatment by the *Goeben's* crew of French vessels anchored in the Dardanelles.

One of the passengers in the French ship *Saghalien* gave a representative of the *Matin* an account of the difficulties encountered by the *Saghalien* in coming out of Turkish waters.

"As the *Saghalien* was preparing to leave the Dardanelles she saw her route was barred by the German cruisers *Goeben* and *Breslau*, which gave her to undertsand that at the least sign of an attempt to get away she would

be sunk. The lieutenant of the *Saghalien* went to the governor and explained to him the heavy responsibility which he was incurring by the threat of the German ships. He also told the governor that he would not leave Turkish waters unless a Turkish tug took the *Saghalien* in tow, and she was convoyed by a Turkish torpedo-boat, which should keep constantly between the *Saghalien* and the German cruiser. The officer also insisted that the governor himself should go down the Dardanelles in the liner as a passenger, and remain on board until she was safe in the open sea. The governor agreed, and the next day the *Saghalien* left Turkish waters without the least attempt to interfere with her being made by the German cruisers."

The Turks have renamed the *Goeben* and *Breslau* the *Sultan Yavuz Selim* (Sultan Selim the Grim) and *Midellu* (Mitylene), respectively. A proportion of their late crews, to the number of 160, landed at Brindisi on August 23, says the *Morning Post* correspondent at Rome. They had traveled via Alexandria, and left immediately for Ala, a town in the Austrian Tyrol. The full complements of the vessels amounted to 1,336 officers and men.

LOSS OF THE "ZENTA."—The Austrian cruiser *Zenta* was sunk on August 16. She had a crew of 302, including 17 officers, and 201 of these are reported to have been lost. The remaining 101 were picked up by Montenegrins and made prisoners of war, according to a telegram from Cettinje to the *Stampa*, quoted by the Central News representative at Rome. British ships are stated to have assisted in the action, according to an account from Valona given in the *Corriere Della Tera*, and it is also affirmed that the commander of the British flotilla handed over the prisoners to the local authorities, who sent them to Cettinje. A sister-ship, the *Szigertvar*, was seriously damaged during the sweep up the Adriatic of the Anglo-French fleet, while of two destroyers which were also in action, one was sunk, according to the Malta correspondent of the *Daily Telegraph*, and the other got to the lee of the crippled cruiser and eventually made off.

THE COMMANDER-IN-CHIEF.—The command of the allied fleet in the Mediterranean and Adriatic has been for some days now in the hands of the French Commander-in-Chief, Admiral Boué de Lapeyrère. In announcing that this officer had assumed charge of the combined Anglo-French fleets, the Press Bureau added:

"As a consequence, Admiral Sir Berkeley Milne, Bart., who is senior to this officer, has given over the command of the Mediterranean fleet and returned home. The conduct and disposition of Admiral Sir Berkeley Milne in regard to the German vessels, *Goeben* and *Breslau*, has been the subject of the careful examination of the Board of Admiralty, with the result that their Lordships have approved the measures taken by him in all respects."

DARDANELLES MINED.—The Board of Trade on August 19 issued the following:

"Information has been received that a new field of mines has been laid in the Dardanelles in the zone formerly sown with mines of the observation type. It may be assumed that some of these latter had previously been removed. The new contact mines, to the number of 41, were laid in double line from Kephez to Suandere."

PORTS MINED.—The Board of Trade announced on August 23 that information has been received to the effect that the port of Bourgas is closed, that Varna can be entered in the daytime only, and that vessels must stop at the mouth of the Kamtchia and wait for a pilot.

LINER DESTROYED.—The first occurrence after war with Austria-Hungary was declared was the destruction by a mine of the Austrian-Lloyd steamer *Baron Gautsch*, which left Lussin-Grande, south of the Gulf of Quarnero, on August 14, for Trieste. The mine had evidently been laid by the Austrian warships. The *Baron Gautsch* was a triple-screw steamer of 2060 tons, fitted for oil fuel, and was built at Dundee by Gourlay Brothers in 1908. The Austrian-Lloyd Company has nearly 70 steamers, ranging in size from 8500 tons downward. Its headquarters are at Trieste, where it was officially stated that on board the wrecked steamer there were 246 passengers and 64 crew, altogether 310 persons, including many women, of whom 179 were rescued. The Austrian-Lloyd Company dispatched the steamer *Graf Wurmbrand* to Pola to bring the rescued to Trieste.

FAR EAST

Naval powers in the Far East are represented as follows:

GERMANY

Scharnhorst, *Gneisenau* } armored cruisers.
Emden—light cruiser.
Iltis, *Jaguar*, *Luchs* } old cruisers.

4 other small vessels.
2 destroyers.
Last reported at Kiauchau.
(The armored cruisers have a speed of 23 knots and the light cruiser from 23 to 25 knots.)

AUSTRIA

1 small cruiser—*Kaiserin Elizabeth*.

FRANCE

2 armored cruisers.
1 destroyer.
1 gunboat.
4 river gunboats.

GREAT BRITAIN

1 battleship.
2 light cruisers.
2 cruisers.
8 destroyers.
4 torpedo-boats.
3 submarines.
10 river craft.
6 sloops.
Some other small craft.
(The armored cruisers have a speed of from 20 to 25 knots, and the destroyers, 26 knots.)

JAPAN

2 dreadnoughts.
13 pre-dreadnoughts.
2 battle cruisers.
13 armored cruisers.
13 light cruisers.
52 destroyers.
27 torpedo-boats.
15 submarines.

(The battle cruisers *Kongo* and *Hiyei* are the heaviest vessels in the fleet as well as the fastest, in addition to being armed with eight 14-inch guns. The armored cruisers are also heavily armed for their size, four carrying 12-inch guns. It is interesting to note that as many as 11 armored ships were built in Great Britain, including the battle cruiser *Kongo*.)

BRITISH DESTROYER SHELLED.—A British destroyer, approaching too far in towards the forts at Tsingtau during the chase of a German destroyer, sustained a few casualties. The Press Bureau issued a notice stating that "the Commander-in-Chief in China reports (undated), that the destroyer *Kennet* while chasing a German destroyer, *S 90*, approached too close to the fortress at Tsingtau (Kiao-Chau), and sustained the following casualties. It should be said that the *Kennet* was not materially damaged."

The casualty list included three seamen killed, three severely wounded, and four slightly wounded, or a total of ten men affected out of her full crew of 70. The *Kennet* belongs to the *River* class, of which there were several in the China flotilla at the outbreak of war.

The *Kennet* is a tender to the battleship *Triumph* on the China station, and according to the August Navy List is commanded by Lieutenant Commander F. A. H. Russel.

The vessel was built at Messrs. Thornycroft's Works, where she was launched in 1903. She has a displacement of 640 tons, and her dimensions are: Length, 222 feet; beam, 23½ feet; draft, 9 feet 6 inches. With an indicated horse-power of 7500, she attained a speed on trials of 25.99 knots. Her armament consists of four 12-pounders and two torpedo-tubes. She has a complement of 70 officers and men.

The German destroyer *S 90* is one of a batch of 12 built in 1900 of 400 tons displacement, and 26 knots speed.

ALLIES FLOAT JAPAN'S FLAG.—The British, Russian and French embassies are flying the Japanese flag as symbolic of the alliance. Vice Admiral Tomosaburo Kato has been appointed commander-in-chief of the first squadron; Vice Admiral Sadakichi Kato, commander of the second squadron; and Rear Admiral Tsuchiya, commander of the third squadron. —*Boston Transcript.*

DECLARATION OF KIAUCHAU'S BLOCKADE.—The text of the Japanese Note declaring the Kiauchau blockade signed by Vice Admiral Kato, commander-in-chief of the second fleet, follows:

"I hereby declare that on this 27th day of August, 1914, the entire coast extending from 120 degrees 10 minutes E. and 35 degrees 54 minutes N. to 123 degrees 16 minutes E. and 36 degrees 7 minutes N. (the entire coast of the leased territory of Kiauchau) has been placed in a state of blockade by a competent force of His Imperial Japanese Majesty's ships under my command, and that the said blockade continues in force; and, further, that the neutral vessels in the zone of blockade are allowed 24 hours with which to withdraw from the said zone. Any vessel that attempts to violate the blockade will be dealt with in conformity to the law of nations and the respective treaties between the Empire of Japan and the neutral powers. Given on board His Imperial Majesty's ship *Suo,* this 27th of August, 1914."

KIAUCHAU GARRISON.—The entrance to Kiauchau Bay is about two miles wide, and is encircled by elevated ground rising to a height of some 600 feet. Sites were chosen for fortification, and a variety of defensive works had been completed and armed, but not, it is understood, to anything like the extent projected. Some German writers have asserted that the place is still insufficiently protected against a landward attack, and General von Bernhardi not long since urged a further expenditure of £5,000,000 to put the place in a thorough posture of defence. The peninsula, however, which forms the northern side of the bay is certainly defended on the land side. As to the strength of the garrison, this has been variously estimated at from 5000 to 7000 seamen and marines. These include at least four companies of seamen gunners, a similar number of marines, some cavalry and field gunners, and a company of sappers. The whole of the defences are under naval control, and the governor is a naval officer. It is likely that the garrison has been augmented, for from all parts of China Germans have been flying to Kiauchau for protection, and it must be that among them are many capable of bearing arms.

Since 1898 every effort has been made to fit Tsingtau as a complete naval base and repairing station for the German eastern squadron. The yard is completely equipped for carrying out large repairs, and although no vessel is known to have been put together at the port, there are facilities for the

construction of small craft. The refit of any ship is quite within the province of the yard, and recently the *Scharnhorst*, a heavy armored cruiser, was repaired and reboilered there. Apparently at one time it was intended to send two of the older coast defence battleships of the *Hagen* class to Tsingtau, but this plan was never carried out, and except perhaps for the *Emden* and *Kaiserin Elizabeth*, there are only a few gunboats and one destroyer for the naval defence of the harbor. There are no submarines, but as at all other German ports, very efficient arrangements for mine defence have been made.

Although it may not be doubted that the place is prepared against a surprise, and that precautions have been taken to make it formidable against sea attack, there must always be a possibility of its reduction from the land side.

PACIFIC

GERMANY

Australia.
3 old cruisers.
East Africa.
Konigsberg, light cruiser.
Mowe, old cruiser.
West coast North America.
Nurnberg, *Leipzig* } light cruisers.

ENGLAND

East Indies.
1 battleship.
2 light cruisers.
Persian Gulf.
4 small craft.
Cape of Good Hope.
3 cruisers.
1 gunboat.
New Zealand.
3 cruisers.
1 sloop.
Royal Australian Navy.
1 battle cruiser.
3 light cruisers.
3 destroyers.
2 submarines.
West coast Canada.
2 submarines.
West coast of America.
2 gunboats.

FRANCE

1 despatch boat.
1 gunboat.

GERMANY'S OUTLYING POSSESSIONS.—The following is quoted from the *London Times:*

The plan of campaign in the Pacific no doubt includes the seizure of all the German possessions in those waters. But, in addition, it is essential that as soon as possible the wireless stations which the Germans possess in the Pacific should be wiped out or transferred to our hands. Besides German New Guinea, with a territory of about 70,000 square miles, there is the Bismark Archipelago, with another 20,000 square miles, some of the Solomon Islands, with 4000, the Caroline, Ladrone, and Pelew Islands, with 380, and the Marshall Islands, with about 160 square miles. The total white population of these islands is said not to exceed 1500 persons. Then further to the eastward are the Samoan Islands, with an area of about 1000 square miles and a white population of perhaps 500.

SAMOA OCCUPIED.—Through the Press Bureau the following announcement was made:

"The Secretary of State for the Colonies has received a telegram from the Governor of New Zealand stating that Apia, in German Samoa, surrendered at 10 a. m. on August 29 to an expeditionary force sent by the Government of New Zealand."

Samoa consists of an archipelago of 14 islands in the Pacific, eight of which belonged to Germany. Previously Great Britain, the United States, and Germany were interested in the government of the islands, but troubles were frequent, and in 1900 Great Britain withdrew her claims to any portion, receiving compensation from Germany by concessions in other parts of the world. Germany's former islands of Savaii and Upolu are the largest of the group, with a total area of 1000 square miles and a resident German population of 329. The other six islands are held by the United States.

The North German Lloyd steamer *Princess Alice* reached Cebu from Zamboanga August 26 with a huge hole in her stern, patched up with cement. The captain admits that after leaving Manila he tried to establish wireless connection with Yap, one of the Carolina islands, but found that the Yap station had been destroyed by the British. While speeding from Zamboanga he was chased by a British warship and barely reached port. He does not explain the damage to his vessel. The *Princess Alice* sailed from Hamburg June 25 for Yokohama, and arrived at Penang July 29.—*Boston Transcript.*

ATLANTIC

GERMANY

West Africa.
Panther } old cruisers.
Eber }

West Indies.
Karlsruhe, light cruiser.
Dresden, light cruiser.
Strassburg, light cruiser.

GREAT BRITAIN

East coast of America.
5 cruisers.

Southeast coast of America.
1 cruiser.

W. coast of Africa.
3 sloops.

FRANCE

2 cruisers.

KAISER WILHELM DER GROSSE CAPTURED.—In the House of Commons on August 27, Mr. Churchill said:

"The Admiralty have just received intelligence that the German armed merchant cruiser *Kaiser Wilhelm der Grosse,* of 14,000 tons, and armed, according to our information, with 10 guns of approximately 4-inch caliber, has been sunk by His Majesty's ship *Highflyer* off the Oro River on the West African coast. This is the vessel which has been endeavoring to arrest traffic between this country and the Cape, and is one of the very few German armed auxiliary cruisers which has succeeded in getting to sea. The survivors were landed before the vessel sunk. The *Highflyer's* casualties were one man killed and five slightly wounded, and the names have been given to the Press Bureau."

The following message has been sent to the cruiser *Highflyer:*

"Admiralty to *Highflyer:* Bravo! You have rendered a service not only to Britain but to the peaceful commerce of the world. The German officers and crew appear to have carried out their duties with humanity and restraint, and are therefore worthy of all seamanlike consideration."

The sunken German ship was built in 1897, and was employed in the Transatlantic service. She appears to have slipped away from Bremerhaven in the first week of the war. The *Highflyer* was employed before the war as a training ship for special entry cadets, but how many, if any, of them remained in her is not clear. Her commander is understood to be Captain H. T. Buller.

The *Kaiser Wilhelm der Grosse* has held up several vessels on the Cape route. One of the most notable was the Union Castle liner *Galician*, which was discovered by the German vessel on August 15, off Ferro, Canary Islands. The *Galician* was stopped, inspected, had her wireless destroyed, her passengers and crew mustered, and two military men, Lieutenant Deane, of the East Lancashire Regiment, with a private of the Royal Garrison Artillery, removed as prisoners of war. Captain Day and the *Galician's* officers bear testimony to the courtesy with which the Germans carried out their task. They refused tobacco offered them unless it was paid for, saying, "We don't want it to be said that we robbed your ship," and when asked if the passengers were to be landed on one of the islands, they answered, "We are not barbarians." The *Galician* was made to alter course and follow the German vessel until 5 a. m. on the following morning, when she was informed that "on account of the women and children on board we will not destroy your vessel; you are released."

TRADE PROTECTION.—Such naval operations as have taken place in the Atlantic have been concerned with the capture of German merchantmen by British and French warships, and with the menace to British commerce from the German light cruisers and armed merchantmen in that ocean. The captures of the French and British vessels have been both numerous and varied. Coupled with the seizure of German merchant ships in our ports, they must have effected a considerable if not altogether an entire stoppage of Germany's seaborne trade. There are four German light cruisers in the Atlantic, the *Dresden*, *Strassburg*, *Karlsruhe*, and *Königsberg*. Although none of them has been captured, possibly because of the fact that the heavier and older British armored cruisers which are detached for duty in the Atlantic are slower than these fast but weakly-armed vessels, it does not appear that British commerce has suffered much, if at all, at their hands. They may have been principally occupied so far in dodging the British cruisers and seeking opportunities to replenish their bunkers. The *Mauretania*, when off Sable Island on the night of August 6, was warned by the *Essex*, Captain H. D. R. Watson, to make for Halifax instead of New York, to which she was bound. She did so, and by extinguishing lights and blanketing her portholes reached Halifax safely next day. The *Essex* also escorted the liner *Cedric* to Halifax. Of the German liners converted into armed cruisers, the *Kronprinz Wilhelm* is stated to have left New York on August 5, nominally for Bremen, but without a single passenger. Her superstructure was painted the naval color, grey, and she had 6000 tons of coal on board, with provisions and sea stores. No doubt she has picked up, or endeavored to pick up, the German cruisers. The Hamburg-Amerika liner *Blucher* is probably one of the armed merchantmen in the South Atlantic. The light cruiser *Bremen* is reported to be in that region, and was reported on August 6 off the Brazilian coast, shepherded by the British light cruiser *Glasgow*, Captain John Luce, which has made many captures outside Brazilian waters.

SEIZURE OF TOGOLAND.—Although it was not effected by naval forces, the seizure of Togoland August 7 is of some consequence to the navy by reason of its facilities for wireless communication. It was officially stated on August 8 that, acting on instructions from the Secretary of State for the Colonies, the British forces in the Gold Coast Colony seized the port of Lome, in German Togoland, on the West Coast of Africa. No resistance was offered, and South Togoland up to 120 kilometers north from the coast was simultaneously surrendered. Togoland is situate between the Gold Coast and Dahomey, the French Colony, and although the coast line is small the territory inland widens considerably, and the area exceeds 33,000 square miles. It had belonged to the German Empire for some 30 years. Lome, which was seized, is the chief port and capital of the colony. With the capture of Togoland, one of the largest wireless stations in the world

has been acquired by Great Britain. It was here that, after long and costly experiments, the Telefunken Company established a station capable of communicating with Berlin, over 3000 miles away. Regular communication was to have been established by May last, and the station is understood to be practically if not entirely complete. A Central News telegram from Nairobi, British East Africa, on August 9 reported the destruction of the German wireless station at Dar-es-Salam, in German East Africa.

MISCELLANEOUS

The following message has been addressed by His Majesty the King to Admiral Sir John Jellicoe:

"At this grave moment in our national history I send to you, and through you to the officers and men of the fleets of which you have assumed command, the assurance of my confidence that under your direction they will revive and renew the old glories of the Royal Navy, and prove once again the sure shield of Britain and of her empire in the hour of trial.

"GEORGE R. I."

The above message has been communicated to the senior naval officers on all stations outside of home waters.—*London Times.*

THE CONTROL OF THE SEA

The magnitude of the land campaigns, with their terrible drains on national resources and strength, has the effect of obscuring in some measure the importance of sea power and its exercise in determining the progress and character of the war. The work of her navy has been of especial importance to England, and is recognized by comments quoted below from the British press. The four main achievements of the fleet are numbered and indicated as topic headings.

(1) DESTRUCTION OF ENEMY COMMERCE.—The striking fact to be realized is that British floating trade is proceeding nearly as usual by reason of British naval supremacy. The German commercial flag has been swept off the oceans, the ships which formerly sailed under it being captured by British or French cruisers or driven into neutral harbors. In this way is the silent and static force of sea power exercised. Germany cannot help but feel soon the enormous pressure which the loss of her seaborne commerce inflicts upon the life of her people.—*Naval and Military Gazette.*

(2) PROTECTION OF HOME COASTS AND COMMERCE.—"Thank God and the British Navy for my good dinner."

Every British child should be taught to say this grace. It would impress upon their minds an irrefutable fact. It would remind their parents that it is the British fleet which, under the good providence of God, stands between them and starvation. As things are, we owe it to the British seamen that we are a nation. So to the British seamen also we shall owe the continued existence of the empire.

And the security provided by the fleet has not only saved us from starvation. By the influence it has exerted it has also saved our national credit. This means that not only has it preserved us from ruin, but it has enabled us to help our allies with money and supplies, which we could not have done if our credit had failed.

All this the British fleet has already done for us by its toil, its sacrifice, and its endurance. There are vast stores of surplus provisions in the north of Russia which before the war found a market in Germany. Now we are the purchasers, and the fleet ensures them safe passage across the seas.

All the neutral powers, moreover, must benefit by the security which the British fleet affords upon the ocean highways, and this with scarcely

the firing of a shot. The navy not only fills our provision shops with supplies from oversea for our consumption at prices which have made the pinch of war scarcely felt by many families more than as a temporary inconvenience. The effect it exerts, by what it has already done, permits the import of raw material needed for our manufactures. In this way it is a benefit to the cotton raisers in the Southern States, and to any neutral country which has products to be manufactured into goods in this country for the markets of the world.—*London Times.*

(3) SAFE TRANSPORT OF TROOPS AND SUPPLIES.—The safe conduct of the expeditionary force from this country to the Continent represented a triumph for sea power. As a contemporary has pointed out, "the landing of the expeditionary force on the Continent within a fortnight of the declaration of war is one of the most remarkable events in the history of the war." The testimony is not exaggerated. In the whole history of sea power this successful operation is perhaps the most striking example of the use of naval power that even our history has ever afforded. It used to be an axiom held sacred by most naval officers that no country should attempt to transport troops across the sea until the enemy's fleet had either been defeated or shut up in harbor. The British Navy had achieved neither of these two things when the transportation began. Nevertheless, the Admiralty accepted full responsibility, having full confidence in the influence of a fleet in being able to prevent interference. A mass of transport, as has always been held in these columns, is the most cumbrous and vulnerable engine of war in the face of a determined enemy possessing even inferior naval power. As the *Manchester Guardian*, in an admirable statement, has pointed out, "during the Russo-Japanese War a rumor reached Tokio that the Russian fleet had escaped from Port Arthur in a snowstorm, and transportation of troops was stopped in consequence for ten weeks. In the American War with Spain a similar report stopped the transportation of Shafter's Army from Key West to Santiago until it could be verified. Neither with the Japanese nor with the Americans was there any doubt of their ability to defeat the enemy's fleet. The bare suspicion that a few of the enemy's ships were at sea was enough to stop the whole work of transportation. It was not considered safe to send ships oversea until everyone of the enemy's ships had been accounted for.—*Naval and Military Record.*

(4) ACCOUNTING FOR THE ENEMY FLEET.—What is the work of the British Navy? Its task is simply defined. It is to account for the armed forces of its enemy at sea. It may account for them in various ways. They may be locked up in their own or neutral harbors and thus rendered incapable of action, or they may be found at sea and destroyed. The main fleets of the enemy have now had the choice of coming out and challenging battle, and as they have not accepted it they are as completely paralyzed for the time as if they had been beaten at sea. This is the work which the British Navy has done and is doing.—*London Times.*

CAPTURING MERCHANTMEN.—From all round the coasts of Great Britain, and from many of our possessions oversea, come reports of the enormous number of merchant ships of the enemy, which have been captured and interned. How complete this holding up of German floating trade has been may be judged from the fact that within 24 hours of the declaration of war, more than 20 merchantmen, representing some 40,000 tons of shipping, had been either captured by British and French warships or seized in British territorial waters. Among the more notable vessels detained are several big liners. Of the Hamburg-Amerika line, the *Kronprinzessin Cecilie* was seized at Falmouth, as was the *Prinz Adalbert*, while the *Belgia*, bound from Boston to Hamburg, with a large amount of specie, over £200,000 worth of food, and 73 German reservists, was captured off Ilfracombe and taken to Newport, Mon. Some of the North German Lloyd

vessels are also included in the captures. The *Schlesien,* with a cargo of grain, was overhauled by the *Vindictive* and brought into Plymouth, while another ship of this line was reported to have been taken off Aldeburgh. But by far the larger proportion are less well known steamers carrying food and raw materials. The *Diana,* cruiser, took the German schooner *Else,* from Rio Grande, with a cargo of hides, and brought her to Falmouth. Another of our cruisers captured the *Marie Gleset,* a similar steamer, off the Isle of Man, and took her to the Clyde. Likewise the *Grafton* brought into the Clyde the German steamer *Behrens,* captured off the Mull of Galloway. The fishing lugger *Berlin,* of Emden, fell a prize to the battle cruiser *Princess Royal,* and was sent into Wick. An important seizure on August 6 was that of the steamer *Kumeric* at Queenstown with 49,000 qr. of wheat on board. Of course, the same thing is happening all over the world. The *Glasgow* reports having captured several German merchantmen outside Brazilian waters. The Sydney customs officers have been detaining all German ships there, as is being done at other Commonwealth ports. In the Mediterranean, the prizes include a Levant liner, captured by destroyers.—*Army and Navy Gazette.*

NAVAL RESERVES CALLED OUT.—The British Admiralty issued the following notice to the press calling out the reserves on mobilization:

The Admiralty have given orders that the following classes of Naval Reserves and Naval and Marine Pensioners shall be called into actual service:

Royal Fleet Reserve, Immediate Class.
Royal Fleet Reserve, Class A.
Royal Fleet Reserve, Class B.
Royal Naval Reserve, all classes (including Trawler Section).
Naval Pensioners.
Marine Pensioners.
Royal Naval Volunteer Reserve.

Notice is hereby given by their Lordships that all Naval and Marine Pensioners under the age of 55 and all men of the Royal Fleet Reserve and Royal Naval Reserve are to proceed forthwith to the ship or establishment already notified them, or, failing any previous orders, they are to report themselves in person immediately as shown below, viz.:

Naval and Marine Pensioners, including men of Class A, Royal Fleet Reserve,	to	Their Pensioner Center Officer.
Royal Fleet Reserve, Class B,	to	The Registrar at their Port of Enrollment.
Royal Fleet Reserve, Immediate Class,	to	In accordance with instructions already issued.
Royal Naval Reserve, All Classes,	to	The nearest Registrar of Naval Reserve (Superintendent of a Mercantile Marine Office).

Men of the Royal Naval Volunteer Reserve are *all* to report themselves immediately to their Officer Instructor or Volunteer Mobilizing Officer irrespective of whether they have been previously appropriated or not. All men should, if possible, apear in uniform and bring with them their regulation kit, certificate book, or Service certificate, and in the case of pensioners, their pension identity certificate.

Men who, through absence at sea or for other unavoidable cause, are unable to join immediately are to report themselves as soon as possible. Reasonable travelling expenses will be allowed.

TURKISH AND CHILEAN VESSELS TAKEN OVER.—The Secretary of the Admiralty announces:

"His Majesty's Government have taken over the two battleships, one completed and the other shortly due for completion, which had been

ordered in this country by the Turkish Government, and the two destroyer-leaders ordered by the Government of Chile.

"The two battleships will receive the names *Agincourt* and *Erin*, and the destroyer-leaders will be called *Faulkner* and *Broke*, after two famous naval officers."—*London Times.*

NYASSA STEAMER SEIZED.—The far-reaching and world-wide effects of the war are strikingly illustrated by an official announcement issued by the Press Bureau. The Secretary of State for the Colonies has been informed by the Governor of Nyassaland that the Nyassaland Government armed steamer *Guendolen* completely surprised the German Government armed steamer *Von Wissmann* at Sphinx Haven, on the eastern shore of Lake Nyassa. The engines and guns were removed from the *Von Wissmann*, and the master engineer and mechanics taken prisoners. The *Guendolen*, which effected the capture, is a twin-screw steel gunboat of 350 tons, schooner-rigged, with a speed of 11 knots and an armament of four 6-pr. guns. She was built in Scotland by Messrs. Rennie in 1897, sent out to Africa in sections, and launched into Lake Nyassa in the following year. The *Von Wissmann*, or *Hedwig von Wissmann*, to give the vessel her full name, is a somewhat smaller lake gunboat, with a length of 125 feet, as compared to the 136 feet of the *Guendolen*.

SCORE TO SEPTEMBER 23 IN WAR'S NAVAL BATTLES: BRITISH LOSSES 9 SHIPS, GERMAN, 15.—The British Navy has lost three armored cruisers, three light cruisers and one torpedo gunboat so far in the present war. The German Navy has lost five light cruisers, three destroyers, a submarine and two converted merchant ships. In addition there was an unconfirmed report early in the war that two German cruisers had been disabled and taken to Hongkong.

British Losses

August 7.—Light cruiser *Amphion*, sunk by mine off the coast of Holland after destroying mine layer *Koenigin Luise*.

September 3.—Torpedo gunboat *Speedy*, on fishery patrol, sunk by mine in the North Sea.

September 6.—Scout cruiser *Pathfinder*, sunk by submarine in the North Sea.

September 7.—Cruiser *Warrior* went aground near the Bosporus.

September 19.—Australian submarine *A E 1* lost (believed to have been by accident).

September 20.—Cruiser *Pegasus*, completely disabled by German cruiser *Konigsberg* in the harbor of Zanzibar.

September 22.—Armored cruisers *Cressy*, *Hogue* and *Aboukir*, sunk by German submarines in the North Sea.

German Losses

August 5.—German converted minelayer *Koenigin Luise*, sunk by British cruiser *Amphion* off coast of Holland.

Cruiser *Panther* reported sunk near Bona, Algeria, by French cruisers.

August 7.—Cruiser *Augsperg*, sunk by a Russian torpedo-boat in the Baltic Sea.

August 9.—Submarine *U 15*, sunk in North Sea by British cruiser *Birmingham*.

August 27.—Converted cruiser *Kaiser Wilhelm der Grosse*, sunk by British cruiser *Highflyer* off the west coast of Africa.

August 28.—Light cruiser *Mainz* and the *Coeln*, the light cruiser *Ariadne* and two destroyers, including the *V 157*, sunk by a British fleet in the Bight of Helgoland.

Light cruiser *Magdeburg*, aground on island of Oldensholm at entrance to Gulf of Finland in a fog, destroyed by Russian warships.

Destroyer *S 90*, sunk off the Chinese coast by British destroyer *Welland*.

September 6.—Submarine destroyed. This was the submarine that destroyed the *Pathfinder*.

September 13.—Light cruiser *Hela*, sunk by British submarine off Wilhelmshaven.

September 14.—Converted cruiser *Cap Trafalgar*, sunk by British converted cruiser *Carmania* off the east coast of South Africa.

Austrian Losses

August 16.—Two cruisers sunk by French ships off Budua, Dalmatia.

August 17.—Torpedo-boat *No. 19*, sunk by mine off Pola, in the Adriatic.

August 22.—Cruiser *Zrinyi*, sunk by French ships in the Adriatic.

September 14.—Torpedo-boat *No. 27*, sunk by mine in the harbor of Pola.—*New York Sun*.

NAVAL PUBLICATIONS

BOOK REVIEWS

"George Hamilton Perkins, Commodore, U. S. Navy, His Life and Letters." By Carroll Storrs Alden, Ph. D., Instructor in English, U. S. Naval Academy. (Houghton, Mifflin Co. Price $1.50 net.)

A biography, full of the life of the sea in the days when sails were slowly giving place to steam, taking us into the innermost life of that gallant seaman, mettlesome fighter, courtly gentleman, George Hamilton Perkins. The book gives a short sketch of the early life and midshipman days of the young sailor. Life at the Naval Academy, very different in many particulars from that of to-day, was, in other ways, strangely like the present "middy's" existence, and Perkins had the same difficulties, anxieties, and pleasures that are suffered or enjoyed by young naval students of our time. One of the most interesting chapters is that one portraying a cruise on the west coast of Africa, chasing slavers, showing the flag, enduring shipwreck and fever. The young officer's letters home are not always in literary style, but have a charm of their own that brings out the picture of the old navy.

Letters written from before New Orleans, from the West Gulf Blockading Squadron, and from the memorable, stirring scenes about Mobile Bay, throw new light on the naval operations of that great conflict which so nearly split our Union forever. Perkins came out of the war as captain of the Chickasaw, "the crack vessel of the ironclads." What are, perhaps, his most interesting letters after the war were written while visiting Siam. The last chapter of this most readable biography tells of life on a New Hampshire farm where the commodore settled and lived in ship-shape fashion with his family and neighbors after a well-rounded experience of the hardships and delights of the sea.

Doctor Alden, well qualified by his associations and deep historical study, has given us an unusual, clear, and entertaining life history of a very engaging seaman and warrior.

W. F. JACOBS.

"German Sea-Power—Its Rise, Progress and Economic Basis." By Archibald Hurd and Henry Castle. (Scribners Sons, New York. $3.50 net.)

This volume of 388 pages is a valuable contribution to naval literature and should be studied by naval officers and all interested in naval affairs. The authors are two Englishmen who endeavor to convey a clear, unprejudiced account of the remarkable rapid growth of German sea-power.

The first chapters are entertaining with interesting historical data of the Hanseatic League and traditional episodes of North German maritime enterprises. But these facts have no connection with the rapid progress of the present German navy. They indicate that Germans may claim the sea habit and traditional naval sentiment.

The other chapters are most valuable in explaining this remarkable rapidity of German naval progress. The navy is a creature of the German Empire, while the German armies are the armed forces of the 26 Sovereign States, and these forces are only combined as an imperial German army in case of mobilization or war. This fact has therefore caused the German Emperor to take special interest and pride in the development of his navy, and he has been the most conspicuous in promoting its progress.

These writers are zealous in their admiration of Admiral von Tirpitz, who has been Naval Minister since 1898, and whose ability and diplomatic tact in securing the support of the Reichstag have earned for him the title of the naval Bismarck.

The book gives details of the German naval programs, and shows how these laws were rapidly executed and administered to increase the strength of the navy.

They explain the beneficial effect of the replacement law by which the government is obligated to replace any ship that may be lost or reach a prescribed age limit, without any further action by the Reichstag. The indefinite provisions of this law permit the widest latitude, so that vessels lost or obsolete by age have been replaced by the most formidable types of modern ships, armored gunboats being replaced by modern super-dreadnoughts.

The beneficial effect of having a definite shipbuilding program to cover a period of years is strikingly illustrated. The first naval program of this character was in April, 1898, and it originally contemplated a fleet of 19 battleships, 8 armored cruisers, and 6 large cruisers to be available, including then existing ships, in the course of seven years. The very proposal of such a law stimulated German shipbuilding firms so that before the law was enacted Admiral von Tirpitz assured the Reichstag that such a naval strength would be provided in six years and they passed the *Sextennat* law. Two years later, 1900, the shipbuilding resources had increased so rapidly that a new program was enacted prescribing double the strength of the *Sextennat* law, and this law was subsequently further amended twice to provide additional ships. The last law of June, 1912, enacted under strained foreign relations, now provides for a naval strength in 1917 of 41 battleships, 20 large cruisers, and 40 small cruisers or scouts, flotillas of torpedo-boats, and submarines also. Some auxiliaries are automatically provided by the German marine law that requires all German steamship companies to give their vessels and all their resources to the German navy at any time, in peace or war, for such compensation as the naval secretary may deem to be just.

The manner in which the government executes this law shows that in 1917 the German navy will have 61 capital ships, the indefinite phrase "large cruiser" being now interpreted as latest formidable type of the battle cruiser.

The rapid development of German naval shipbuilding plants is most clearly illustrated by a tabulated list of all these 35 firms, with the data of their plants. The list shows 35 shipbuilding plants, including three imperial navy yards, that have a combined total area of 7,800,000 square meters, with 191 building slips, 27 drydocks and 47 floating docks. They employ directly 89,700 persons, and indirectly probably three times as many more laborers. These figures emphasize the marvellous growth of this industry, when it is remembered that in 1898 there were but three such shipbuilding plants in Germany and at that time one ship was being built in England for the German navy. These facts show that German labor has no complaint against German shipbuilding policy. Von Tirpitz has had but little difficulty to persuade even a Socialistic Reichstag to approve his plans. Construction of armaments have enriched Germany instead of impoverishing her, as is claimed by the Carnegie Disarmament Company.

It is impossible in this brief space to mention all the good points of this excellent book. Some will dispute the writers' claims that Admiral von Tirpitz deserves the greatest credit for this rapid rise of German sea-power, and there are others who are equally or more deserving, the Emperor more so than anyone, but he was influenced by Mahan's works and the Navy League. The great Admiral von Koester and others were all influenced more by Mahan's writings than any other single feature. The book clearly shows that the entire nation, inland as well as on the coasts, is enthusiastically in favor of an adequate navy.

The Economic Basis is largely dependent upon the German merchant marine, whose profitable development has been likewise most rapid and remarkable. German colonial enterprises have been and are still conducted at loss, but they have fed the merchant marine, and net result of both has been advantageous for Germany. It would require another volume to give details of the beneficial effect of the German military and naval compulsory service laws in stimulating this growth and in educating the German people.

The book is highly commended.

W. H. BEEHLER.

"The Panama Canal." By Frederick J. Haskin. (Doubleday, Page and Company, 1914.)

Mr. Haskin opens his preface by saying: "The primary purpose of this book is to tell the layman the story of the Panama Canal." It is written in the style to be expected of the experienced journalist whose name is known to thousands of readers of his syndicate articles, and it fulfils its primary purpose in an excellent way. In its thirty-three chapters Mr. Haskin gives a brief historical review of Isthmian canal projects which ended in the United States Government undertaking that at Panama, discusses the final choice of the lock project instead of a sea-level canal, describes the wonderful organization that has served to complete the work, treats the salient engineering features in a popular way, and closes with some reflections on "A new commercial map" and "American

trade opportunities," with mention in his last chapter of the Panama-Pacific Exposition. The book is not one to meet the needs of technical men; it is popular in conception and in execution. As this review appears in a technical journal, however, a brief mention may be made of one statement of direct interest to the readers of the PROCEEDINGS. Mr. Haskin says, on page 348, that the Canal "will double the efficiency of the American navy by permitting it to concentrate its forces on either ocean in shorter time, by weeks, than can be done by any other nation." Whether this was written carelessly or to express a deliberate conviction, naval officers know that the Canal will not "double the efficiency of the American navy," despite the great military advantage it gives that navy. One of the most interesting chapters is that entitled "American Trade Opportunities," in which Mr. Haskin discusses the conditions in the neighboring Latin-American countries.

H. S. K.

"Our Many Sided Navy." By Robt. W. Neeser. Illustrated. (Yale University Press, New Haven, 1914.)

This book tells interesting things about the navy in a way which is both entertaining and illuminating. The layman will appreciate the clear way in which Mr. Neeser has presented his many sided glimpses into naval life and the knack he has of choosing illustrative points which add color and leave accurate impressions. For the same reason the book is stimulating to the naval man, not so much for the information it conveys to him as for the satisfaction he feels in having his professional and ship life written about by one who knows his subject.

This book is, therefore, recommended to both naval and civilian readers. Its merit is further indicated by the fact that the Department of English at the Naval Academy has added it to the list of books from which the new fourth class midshipmen select their summer reading, because it is believed that it will give the entering class a good idea of naval environment and naval work. There are 42 pages of excellent photographic illustrations, showing the navy at work and at play, at sea and in port.

There are in all 220 pages, of which the contents are indicated by the following table: Preface; Introduction; The Fleet at Sea; The Naval Station at Guantanamo Bay; The Organization of the Ship; The Bluejackets' Daily Life; The Battleship as an Educational Institution; The Engineering Competitions; Athletics in the Navy; The Soldier as Sailor; The Work of the Torpedo Flotillas; Gunnery Training; Target Practice; Appendix I, The Navy's Services in Peace; Appendix II, Organization and Distribution of the Navy, February 1, 1914; Appendix III, The Organization of the Ship; Appendix IV, The Weekly Routine on Shipboard: Index.

C. C. GILL.

NOTICE

The U S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It now enters upon its forty-first year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary, and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

The PROCEEDINGS are published every two months and anyone may subscribe for them. The annual subscription is $3.00; single copies, 50 cents. Annual dues for members and associate members, $2.00. Fee for life membership, $30.00.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1915

A prize of two hundred dollars, with a gold medal, and a life-membership in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1915. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. Any essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

B. C. ALLEN,
Lieut. Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

"A Personnel Reserve for the Naval Service."

"Value of Speed as an Offensive Element in Battleship Strategy and Tactics, as Compared with Armor."

LIST OF PRIZE ESSAYS

1879

Naval Education. Prize Essay, 1879. By Lieut.-Com. A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut.-Com. C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. J. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut.-Com. F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut.-Com. W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U.S.S. Vesuvius, with Special Reference to her Pneumatic Battery. Prize Essay, 1894. By Lieut.-Com. Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut.-Com. Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut.-Com. Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear-Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut.-Com. A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A few thoughts on our next step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut.-Comdr. Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENSE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut.-Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotten, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut.-Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut.-Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut.-Commander Dudley W. Knox, U. S. N.

1914

The Great Lesson from Nelson for To-day. Prize Essay, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. Navy.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. Navy.

NOTICE TO MEMBERS

More members, both regular and associate, are much desired. Any increase in membership invariably means a larger number of papers and essays submitted, and consequently an improvement in the PROCEEDINGS.

NOTICE TO MEMBERS

More members, both regular and associate, are much desired. Any increase in membership invariably means a larger number of papers and essays submitted, and consequently an improvement in the PROCEEDINGS.

You are requested to send or give the attached slip to some one eligible for membership, urging him to join.

By direction of the Board of Control,

B. C. ALLEN,
Secretary-Treasurer.

CONSTITUTION, Art. VII, Sec. 8.—"The annual dues for regular and associate members shall be two dollars, payable upon joining the Institute and upon the **FIRST DAY OF EACH SUCCEEDING JANUARY.** The fee for life membership shall be thirty dollars." There is no initiation fee.

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To the Secretary and Treasurer,
U. S. Naval Institute,
Annapolis, Md.

Dear Sir:

Please enroll my name as a regular member of the U. S. Naval Institute from this date.

Very truly yours,

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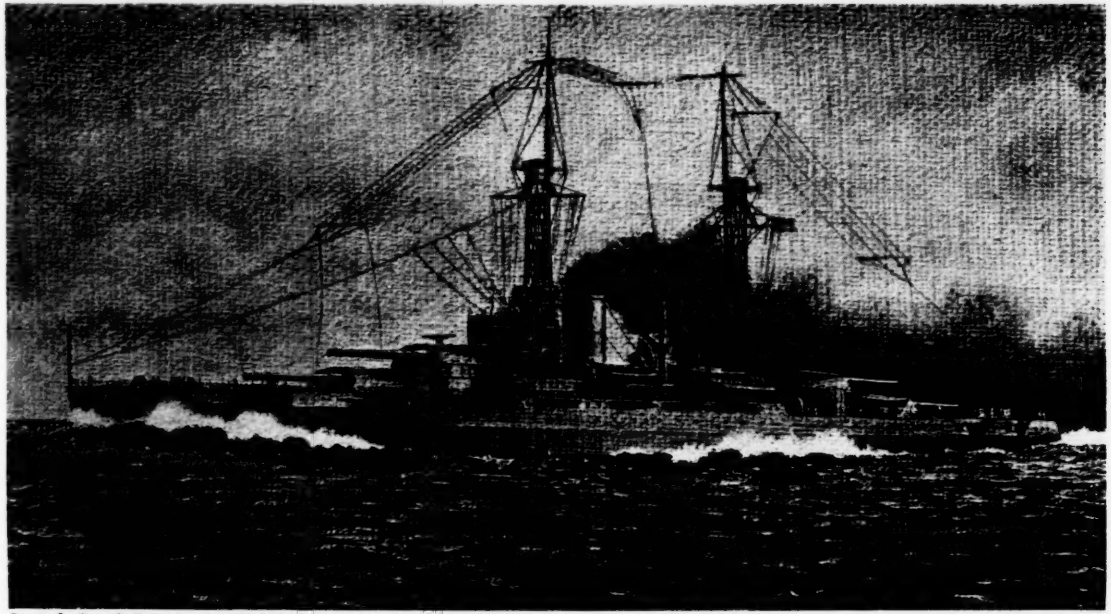

Drawn by Burnell Poole, Associate Member

U. S. S. "ARIZONA"